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LV.

FIBROPAPILLOMA OF THE LARYNX WITH UNUSUAL MOVEMENTS.

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Movable tumors of the larynx are very common; almost all writers upon laryngeal neoplasms mention their occurrence. Their movements may depend upon their attachment to the vocal bands or upon the existence of pedicles. To the latter class belongs that group of new growths so attached and so pedunculated that the incoming or outgoing current of air changes their position in the larynx during respiration and phonation. Posture likewise influences their relations and frequently the symptoms which they occasion.

In Morell Mackenzie's detailed description of the first hundred laryngeal growths treated by him, numerous instances are given of such cases.[1] The following may be noted:

A housemaid, aet. 24, had a small pendulous papillary growth seen between the anterior commissure. On inspiration, it appeard comparatively small, and quite free of the vocal cords; on phonation, it was almost invisible, and on forced expiration it rose above the level of the cords.

A woman, aet. 45, had a movable pedunculated growth, seemingly attached to the right ventricular band. On inspiration a portion of the right vocal cord could be seen

but on forced expiration, the growth was pushed upward and across the larynx, so as to conceal the right vocal cord and part of the left.

A boy, aet. 17, had a papillary tumor extending over almost the whole length of the left vocal cord; upon inspiration it was drawn down, occupying about half the area of the glottis while upon forced expiration it occupied almost the whole of the glottis.

A nursemaid, aet. 23. A long filiform growth was seen to be attached to the right cord near its anterior insertion. The growth occasionally hung down in the glottis, and at other times, lodged between the vocal cord and ventricular band.

Similar accounts have been made by other observes and doubtless the vast majority have never found a place in literature. Still it may be well enough to mention the following which have some bearing upon the case which is made the subject of this paper.

Baldwin[2] described a large papilloma which was attached by a rather broad base to the edge and upper surface of the left vocal cord, and to the anterior angle between the cords. During inspiration, the tumor would flap across the chink obstructing it momentarily, then as the inspiration effort increased, it would be drawn below the cords allowing the air to enter.

Jurasz[3] relates a case in which there was a growth with a long pedicle attached to a ventricular band; the growth was sometimes above the glottis and sometimes below, often acting as a foreign body when it was thrust against a sensitive portion of the larynx, such as the laryngeal surface of the epiglottis or the plica interarytenoidea.

Navratil[4] reports a case of a man, aet. 48, in whom there was a laryngeal polyp about the size of a plum, springing from below the anterior commissure and appearing above the vocal bands on expiration.

Swiezynski[5] gives the history of several cases of movable polypi of the larynx. In the first case, a tumor about the size of a large pea, attached to the left cord, fell between the cords on phonation. A second case was that of a man, aet. 30, in whom the attachment of the growth was upon the anterior portion of the right cord, while on phonation the tumor was concealed below the left cord.

The case I now report shows some points of difference from those just mentioned, and is altogether more definite as to the movements exhibited.

Miss A. B., weaver, single, 38, consulted me on November 30, 1901, at the instance of Dr. W. A. McCandless. Previous history unimportant—an attack of small-pox at the age of 5 or 6, otherwise she had been in good health. Mother died of uterine cancer at 63 years of age and father died very old; cause of death unknown. Her symptoms began about six years ago, with some hoarseness and difficulty in breathing. The hoarseness had continued, but at present it seemed that there was some obstruction in the larynx which interfered with phonation. The difficulty in breathing had never been very marked until a few days ago, when she had a severe attack of dyspnea during which she was almost suffocated. She is not certain just now how the attack developed, beyond the fact that she had been awakened during the night by difficult breathing. She endeavored to relieve herself by taking a glass of water and immediately lost consciousness, remaining unconscious and in imminent danger of suffocation for an hour and a half. The details of this attack were very difficult to obtain, as it occurred in the night, and as no physician arrived in time to witness it.

Careful questioning elicited the following facts relative to her breathing: There was a little obstruction to inspiration, but more or less interference with expiration. As she expressed it, there seemed to be a weight preventing the complete emptying of the chest. In lying down on the right side, breathing was fairly easy, but the patient could not lie on the left side more than a few moments on account of the dyspnea which would supervene. She was comfortable when lying on her back—much more so than when lying on her abdomen.

Altogether she had had little annoyance from her condition as she accommodated herself to the postural requirements. It was the sudden attack of dyspnea and the fear of another that impelled her to seek further medical advice. She had been treated by various physicians for catarrh, asthma and laryngitis, but without avail.

The patient was a strong, well-nourished woman whose breathing did not indicate any material laryngeal ob-

struction. Her voice was jerky and ineffective as if there was some obstruction at the glottis.

Examination of the nose and pharynx showed nothing except hypertrophy of the lingual tonsil. Epiglottis, arytenoids, ventricular bands and superior surface of vocal bands presented nothing abnormal.

On inspiration, there seemed to be a growth of some character on the posterior wall of the infraglottic portion of the larynx and trachea as shown in figure 1. As expiration began a tumor would rise between the cords (figure 2), swinging around from the under surface of the right vocal band and passing into the supraglottic portion of the larynx. As the expiratory act continued a second tumor (figure 3) would rise in a similar way, and surmount the first tumor, almost completely occluding the glottis from view. As soon as the expiration ceased, the tumors fell again into larynx, in the order in which they appeared.

During phonation a similar condition of things prevailed except that as a rule only the first tumor succeeded in getting above the glottis before the cords came together (figure 4).

The indication for treatment was obvious. Accordingly three tumors were removed by the tube forceps, one $12^1/_2$ grains, one 5 grains and $2^1/_2$ grains, the two largest having a long pedicle. The smallest had only a short pedicle which probably kept it from coming into view on expiration, as at no time before the operation had I been able to see it. There still remained a small tumor, which I decided to leave for a subsequent operation, as the patient was not disposed to have me complete the operation at one sitting.

This permitted me to study the movements of the growth, which, though having a much shorter excursion, at least was typical of the larger. Figure 5 shows this growth in quiet expiration, the patient being in the erect position; the expiratory current of air was often strong enough to carry the tumor beyond the glottis, so that it rested on the superior surface of the right cord.

In inspiration, the tumor either disappeared from view, or remained sticking to the superior surface of the right cord, where it had been left by the expiratory blast, its pedicle being bent over the edge of the cord.

When this took place the tumor could be released from

its contact with the cord by directing the patient to incline her head to the left. In phonation the tumor generally was forced up between the cords though sometimes they came together before the tumor could pass between them.

It was very evident, from this study and from my view of the larger tumors, that the growths had sprung from the inferior surface of the right vocal band and that the pedicles were so long that an unusual excursion of the tumors was permitted. During inspiration while the patient was in the erect position, they hung in the infraglottic portion of the larynx and trachea and caused practically no obstruction to respiration. This same condition manifested itself when the patient lay on her right side as there was very little, if any, obstruction to inspiration. However, obstruction resulted when she lay upon her left side for the growths, from gravitation, would hang across the glottis inferiorily and so far would interfere with breathing. The slight obstructien to breathing while she lay upon her abdomen may be accounted for by the fact that the growths were attached somewhat posteriorly and therefore encroached upon the anterior portion of the glottis more than upon the posterior portion when the patient was lying on her back.

The supraglottic projection of the tumors on expiration and phonation signifies that the current of air, being expired, was strong enough to lift first one, then the other, above the vocal bands, by virtue of their long pedicles. Altogether this is the most interesting feature of the case, for the excursion of the larger tumor from the beginning of inspiration until the end of expiration must have been at least two inches.

The small tumor, which from its lobular appearance seemed to be two growths, was removed two weeks later, and at a subsequent sitting the hypertrophied lingual tonsil was removed with a cold snare. The patient is now (May 28, 1902) entirely well, with no sign of a growth.

The tumors proved to be fibro-papillomata, the connective tissue elements being very abundant and the papillas much enlarged.

The points of interest are the following:

1. The slight interference with respiration. Consider-

ing the large size of the tumors removed it might seem strange that there was not more obstruction to respiration. Certainly if the growths had been attached above the cords, the interference would have been much greater, since the glottis would have been lessened in size instead of the more capacious trachea. In this position too, it is hardly to be doubted that the symptoms from the presence of the tumors would have been much more urgent and would have called for removal before they attained so large a size. In most of the movable tumors reported, the attachment was above the glottis.

2. All of the tumors were pedunculated and hung from the lower surface of the right cord. What was it that encouraged the development of these tumors, all pedunculated, in this location and no where else in the larynx?

3. The movements of the last tumor removed were similar to those of the larger growth. In each instance, the expiratory current caused the growth to pass over the free edge of the right cord into the supra-glottic portion of the larynx.

4. The single attack of severe dyspnea coming on at night was probably caused by the growths being held in the expiratory position, by one of the tumors twisting around another, necessarily diminishing the size of the glottis.

5. Absence of aphonia. The single tumor which appeared above the cord was not sufficient to produce aphonia, its only action being to render the voice jerky, thin and strained. In this connection it may be mentioned that Gottstein[6] states that the voice may undergo frequent changes where a pedunculated tumor is present in the larynx, since during inspiration the growth is drawn below the vocal cords and during expiration it may be suddenly forced between them.

6. The movements were very easy to observe. A large number of practitioners unaccustomed to the use of the laryngoscope readily recognized the condition of things, namely tumors in the larynx, which upon expiration arose from below the cords to a position almost at the level of the superior border of the epiglottis.

BIOGRAPHY.

[1]Morrell Mackenzie.—Essay on Growths in the Larynx.
[2]J. F. Baldwin.—Medical Record, 1890, p. 268.
[3]Jurasz.—Heyman's Handbuch; Kehlhopf und Luftrohre, p. 833.
[4]Navratil.—Centralblatt fur Laryng., etc., XV, p. 46.
[5]Swiezynski.—Arch. fur Laryng., VII, p. 149.
[6]Gottstein.—Krankheiten des Kehlkopfs.

LVI.

NOTES ON THE DEVELOPMENT OF THE PHARYNX AFTER BIRTH.

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There are two phases of human anatomy of great practical importance in medicine which are as yet almost unknown to other than professed anatomists. These are the range of individual variation, and the progress of development after birth. Embryology has indeed done great service to science, but it is a field that experts only can till. Moreover it is discouraging to find, as we have again and again, that what has been taught as certain is later shown to be wrong. This does not apply merely to details, where in fact it would be expected, but sometimes to points of almost fundamental importance. Now the study of post-natal development is one that can be undertaken by anyone who can command comparatively simple apparatus. Much is thus to be learned.

The development of the pharynx, of which the larynx is an outgrowth, is a case in point. The infant's skull is very different from that of the adult in many respects besides its size. In fact the latter is one of the least important. In other words it is practically all cranium. The face is but an insignificant outgrowth. The orbits are relatively large because they are the cases of sense-organs which almost at once become functional; but the face below them is very small. The reason is that the face is essentially composed of the jaws, and the jaws are for the accommodation of teeth. (Note by way of illustration how in the second childhood after the loss of the teeth the jaws atrophy and the face shrinks.) A side view of the skull of an infant compared with that of an adult tells much of the story. A rough and ready method of placing the adult

head in its proper position is to have the upper border of the zygoma horizontal, or rising to a minute degree toward the front. Applying this method to the infant skull one is struck by the fact that the face does not descend in front as in the adult, but that the lower jaw comes but little below the level of the occiput. There is no antrum of Highmore. The little rootless teeth, reposing in their tooth-sacs, extend from the roof of the mouth to the floor of the orbit. The ramus of the lower jaw is very short and the angle a very obtuse one. A striking statement of the peculiar shape of the face is that at birth its breadth is to its height (i. e., to the top of the orbits), as 10 to 4, while in the full grown head it is as 9 to 8.

A median section of either a frozen head or of one hardened by formalin gives even more important information. The basilar process instead of ascending is nearly horizontal, the posterior border of the vomer slants strongly forward, the nasal fossæ are very shallow (vertically), the hard palate if prolonged backward would strike at about the junction of the basi-occipital and the sphenoid. The rather patulous mouth of the Eustachian tube, which in the adult is on a level with the inferior turbinate, is, if anything, below that of the hard palate. Seen from behind, the posterior nares are two nearly round holes, 5 or 6 mm. in height and a trifle broader.

The real danger of a cold in the head at the beginning of life is thus evident.* The naso-pharynx hardly exists. It is not a chamber, but merely a passage from the nose, curving down behind the palate. It is very small, but by way of compensation it is without a pharyngeal tonsil,† or the collections of adenoid tissue about the openings of the Eustachian tubes.

To return to the median section, the outline of the tongue is both peculiar and characteristic. It is relatively long,

*The Head and Neck in Infancy; by the writer in conjunction with Dr. T. M. Rotch. Archives of Pediatrics, Vol. VIII., Sept., 1891.

†It is not meant to deny the presence of the early stages of adenoid tissue in the mucous membrane, nor even the occurrence of ridges on the top of the pharynx, but we cannot remember ever to have seen anything that could fairly be called a pharyngeal tonsil at birth.

because the vertical diameter is strikingly less in proportion than later. Now the tongue arises chiefly from the hyoid bone, and this being attached to the mylo-hyoid ridge of the lower jaw by the muscle of that name, is necessarily in a tolerably fixed relation to it. The larynx in turn is suspended from the hyoid, and thus it is clear that any changes in the position of the larynx must, at least to a great degree, be concomitant with and dependent upon those of the face. As the face grows down the larynx must descend with it.

We have still to examine the under side of the skull of the infant. It is very flat, not only from the non-development of the face, but from the formation of the occipital region. The basilar process is nearly horizontal, and the small occipital condyles barely project. The greater prominence of the condyles, which is found later, goes with the more raised position of the head. The degree of this projection and also the shape of the condyles doubtless cause that particular poise of the head which is characteristic of each individual. There is a greater growth between the front of the condyle and the base of the skull in man than in woman, which explains why men and women hold their heads differently. Of course there must be every degree of difference in the development of these features, which, when slight, causes variations, and when extreme, is called anomalous. The reason for this remark, which may seem foreign to the subject, is that in a similar way the pharynx presents all kinds of variations from what may strictly be called the norm, and some of these variations of structure may have pathologic consequences.

The infant's larynx, minute as it seems, is said to be relatively large, but it is hard to believe that this detail should be of importance. It is worth noting, however, that it is relatively broader and more rounded in front. The top of the epiglottis is on a level with the lower part of the anterior arch of the atlas, and the lower border of the cricoid approaches that of the fourth cervical vertebra.

The changes of the pharynx during growth depend on two processes. The first and most important of these is the development of the face, which, as it enlarges, necessarily grows downward, carrying the hyoid and larynx with it. The other is the rising of the basilar process and

the increased prominence of the condyles. Thus we may roughly picture to ourselves the naso-pharynx changing from a passage to a chamber by the front of the basilar process bending up behind, and the face descending in front. It, of course, is in intimate relation with the progress of the posterior nares. In the course of the first year the diameters of the posterior nares have doubled. but the proportions are about the same; that is each is slightly broader than high. After the second year the height increases more rapidly, but it takes till after puberty for the height to exceed the distance between the internal pterygoid plates. The line of the hard palate carried backward, which at birth was near the junction of the basi-occipital and the sphenoid, at three strikes about the middle of the former. At six it would touch the front of the foramen magnum, which is about the adult condition. In the meantime the back of the septum has become more vertical and the naso-pharynx even at three approaches its definite shape. During this time, however, what has been gained in space is endangered by the growth of the adenoid tissue of this region. After the completion of the first dentition the skull loses the infantile aspect and assumes that of the child, which much more resembles that of the adult. The face still is small; but after puberty there is a marked advance toward the condition of perfect development which is at its highest in middle life.

The descent of the larynx is a very interesting process, concerning which many more observations are to be wished for. The influence of the position of the neck must be taken carefully into account, and we need to know more precisely than we do the limits of individual variation, which is certainly considerable. While we may say that the position which we call the normal one is reached by puberty we do not feel justified in giving the levels for the intervening years. Just what this normal position may be is also a question that is not yet closed. Frozen sections have brought into general acceptance the view which places the lower border of the larynx at the top of the 7th cervical vertebra,or at least near it,but a very interesting monograph by Mehnert* has proved rather disquiet-

*Ueber topographische Altersveränderungen des Atmungsapparatus, Jena, 1901.

ing. His results are obtained from observations on the living, and he believes that during life and in the upright position the larynx lies deeper by one vertebra then after death. If this be true there is no discrepancy, for in the prime of life he places it at the top of the 1st thoracic vertebra. His work has been so carefully done that we do not like to question it; but to one who is not an expert the identification of individual cervical vertebrae in the living is very difficult for more reasons than one. Mehnert shows moreover that the larynx, and indeed the respiratory apparatus as a whole, continues to descend during life. He believes that in old age the larynx may (in the living) reach the lower edge of the 3d thoracic vertebra. This descent is retarded or even interrupted between thirty and sixty, but is none the less progressive during life. In the latter half it is associated with changes in the spine, with increasing girth and weight of the abdominal organs, together with impaired elasticity and tonicity. In early life the descent is a phenomenon in the course of development; in the latter half it is the result of degenerative changes.

LVII.

THE PATHOLOGY AND DIAGNOSIS OF OTITIS MEDIA INSIDIOSA, i. e., SCLEROSIS; WITH REMARKS ON THE TREATMENT.

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In the last ten years considerable progress has been achieved in microscopic research into the diseases of the ear. Our knowledge of pathology has been enhanced more especially through the improved methods of decalcifying, embedding and staining microscopic sections. In the middle of the last century but little definite knowledge existed of the histo-pathologic states of the finer structures of the labyrinth, and the diagnosis and treatment of ear diseases was dependent largely upon macroscopic and clinical observation. The first pathologic condition of the stapes was demonstrated by the anatomist Morgagni, who discovered that a bony deposit caused a complete fixation of the stapes. The clinicians of that early period regarded ankylosis of the stapes as the cause of progressive deafness and considered it to be incurable. Later writers attributed this form of progressive deafness to some lesion of the acusticus, and the designation of "nervous deafness" was introduced. The gradual development of laboratory research and the methods of making functional examination enabled aurists of the last century to diagnose ear diseases and class them, broadly, into affections of the sound-perception and the sound-conduction apparatus. The Toynbee collection of specimens and the labors of Politzer, Moos, von Troeltch and many others, revealed the fact that the majority of diseases of the ear reside in the sound-conducting channel, and many cases of the nervous deafness of the older writers were classed with middle ear disease. Within the last ten years new light was furnished through laboratory and clinical research of Politzer, Katz, Bezold and Siebenmann on the patho-

logy of the disease variously known as sclerosis of the middle ear, dry middle ear catarrh, chronic progressive deafness and otitis media insidiosa.

The term sclerosis was selected by von Troeltsch on clinical grounds, having for its anatomic basis only that the mucous membrane of the tympanum and the ear drum appeared sclerotic. It was held that an interstitial inflammation of the mucous membrane of the tympanic cavity initiated this sclerosis, which by extension involved the chain of ossicles, the oval and round windows. The rigid and dense condition of the membranes was regarded as obstructive to the transmission of sound waves. The disease presented clinically a high degree of deafness with pervious Eustachian canals and normal tympanic membranes. The new findings revealed that the lesions consist not so much of sclerotic conditions of the membrane and ossicles, but rather of a hyperplasia of the bony elements of the capsule of the labyrinth. This osseous process may localize itself to affect simultaneously the cochlea and the ossicular chain, and may also extend to the semicircular canal. The osseous change begins primarily within the bone, independent of middle ear disease, and is allied to that form of disease first described by Politzer as primary capsulitis labyrinthi. This author discovered this pathologic change by autopsy on subjects of advanced age.

Other investigators affirm what Politzer suspected—namely, that capsulitis labyrinthi may begin at an early age and progress slowly to complete fixation of the stapes in the adult. A place of predilection for this osseous formation exists wherever there are deposited cartilaginous elements, as in the compact bone of the capsule, the posterior half of the oval window, at the point of articulation with the stapes, the upper and the lower wall of the cochlea and in any of the semi-circular canals. The most frequent localization is in that part of the ear that is most active—namely, the articulation of the stapes with the oval window.

When confined to the labyrinth this hyperplasia may by its exostoses, much like a neoplasm, affect the integrity of the acusticus in a mechanical way, and induce the symptoms of nervous deafness.

Its localization in the ossicular chain causes either partial or complete fixation, or dislocation of the stapes.

In two out of the twenty autopsies that have thus far been made, was revealed a simultaneous involvement of the sound-perceiving and the sound-conducting apparatus. Siebenmann first demonstrated this combination in the semi-circular canal, the cochlea and the ossicles, the case, in vivo, presenting the clinical picture of nervous deafness. The functional test showed diminished bone conduction. Vertigo without vomiting (necessitating lying down) was exhibited by the patient, being an evidence of involvement of the semi-circular canal. The acusticus was found to be without a lesion. The stapes was partially ossified and dislocated as shown in Fig. 7.

PATHOLOGY.

The osseous process may be divided into two stages, the first of which consists in an active proliferation of all the cellular elements within the bone. New vascular and cellular tissue is formed in the narrow spaces and in the Haversian canals. Among the new formed bone cells may be found giant cells, under the influence of which the basement of the bone substance is principally absorbed. Hollow spaces are formed, and areas of erosion gradually undermine the originally compact bone, which becomes traversed by irregular and abnormal channels. Simultaneous to the absorptive process there is formation and apposition of new bone, but which is unlike the original, being more voluminous and porous. The second stage is ushered in when the progressive changes cease and when the new bone assumes a lamellar structure. Then the abnormally large and thick bone corpuscles are found concentrically arranged, and the nucleus of these later undergoes atrophy. The vascular system is likewise gradually altered by the formation of connective tissue, in which at times may be found fat-cells. The Haversian canals and spaces have been changed in structure by this resorptive and appositional process, and all the cartilaginous elements have been metamorphosed into osseous tissue, as it cannot be found in the new growth. Thus the process constitutes not only a hyperplasia and hyperostosis, but also a metaplasia.

The new structure differs from the normal by its affinity and greater absorptive power of carmine stains, which fact is utilized in the differential diagnosis. The microscopic evidences of this new formation are the osteophytes, situated usually near the stapes articulation. Frequently the stapes is partially absorbed by penetrating blood-vessels and replaced by osseous formations. Sometimes a dislocation of the stapes is produced by an encroachment of the osteophytes. The function of the oval and round window may also be seriously interfered with by the hyperostosis producing partial or complete occlusion. When the process invades the tip of the cochlea, the patency of the Eustachian tube is threatened. Its lumen is narrowed by thickening of the periosteum, as was demonstrated by the microscope. Owing to the great vascularity which attends especially the first stage of this process, it is probable that the distressing tinnitus of progressive deafness may have its origin in the increased capillary circulation.

The structural alteration consequent upon an invasion of this bone-formation into the cochlea and the semicircular canal, may permit a change in the pressure and the density of the labyrinth fluid. The mechanical and physical qualities of the endo- and peri-lymph may be so altered as to interfere with the nutrition of the parts and induce disease. The detonating sounds heard by some patients and the complex of symptoms of Meniere may be ascribed to a perforation of the septum, dividing the endo- and the peri-lymph systems.

While the histologic alterations were found to be identical by different authorities, yet their designation of the bone-hyperplasia differs and new synonymous terms are consequently introduced. Politzer defines it as capsulitis labyrinthi or oto-sclerosis. Siebenmann, noting the resemblance to sponge by its rarefied spaces and porous structure, designated the new formation as spongification. Katz compares the process to Volkman's osteitis vascularis chronica. From personal observations of different specimens the oseous change appears to be identical with the rarefying osteitis of our text-books.

ETIOLOGY.

The etiologic views also differ. Siebenmann regards the disease as probably a resorptive or physiologic process of

ossification of cartilaginous tissues fissue. He does not look upon it as an osteitis, but rather as a final developmental process, which normally does not take place in the temporal bone, though it is the rule in other bones. Bezold believes that the pure cases of sclerosis are not due to catarrhal diseases (although the two may co-exist).

The diatheses of inflammatory rheumatism, gout and scrofula are regarded as predisposing to this bone formation, also the diseases of the naso-pharynx, such as diseased tonsils and adenoids. The theory that a metamorphosis of cartilage into bone may induce the hyperplasia, is strengthened by the fact that Virchow admits the possibility of bone out of cartilage. It is highly probable that the calcareous deposits and other products of inflammation, such as synechia and adhesions may, by their irritation, incite this metamorphosis to activity. Sudden climatic changes and exposure to wet, likewise injuries, such as a fall from a horse, have been associated with the beginning of this disease. It has been frequently observed that the sclerosis is not always a progressive deafness; it may remain stationary and the individual have sufficient hearing-power for social or business intercourse. The microscopic records show that the nerves supplying the bone have always been normal—a fact which will contradict the theory that a trophoneurosis induces the bone disease. In most cases examined the membrane of the tympanum was found thickened, the result of the active hyperemia which accompanies this process; in its first stage, no evidence of round cell infiltration was found. But in very few cases was it discovered that the bone hyperplasia was the sequel to middle-ear suppuration. The search for bacteria as causative factors proved negative. Clinical observation and autopsy records affirm that capsulitis labyrinthi may begin at an early age, and that its duration may be from three to thirty years. The fact that more women than men are afflicted suggests that pelvic diseases may act predisposingly to progressive deafness. Seventeen per cent. are first affected with the disease at the time of the puerperium, this fact suggesting to several authorities the justifiability of committing an abortion in those subjects affected with progressive deafness, as a prophylactic procedure. Dr.

Blake has observed a hyperemia of the promontory in the region of the niche of the oval window in young women, occurring periodically with menstruation and in those subjects affected with erosion of the cervix, malposition of the uterus and other pelvic diseases. With the correction of the pelvic abnormality, the hyperemia disappeared and an improvement of the hearing followed. It is conceivable that a long continued congestion, reflexly induced by pelvic disease in the sensitive region of the niche of the oval window, may incite not only a connective tissue but also a bony hyperplasia. Statistics show that about 10 per cent. of all middle-ear diseases are true sclerosis, and this group according to new discoveries, results as a consequence of a bony or calcareous formation. The fact that the disease affects both ears uniformly, would lead to the conclusion that a constitutional diathesis plays a certain roll. The Toynbee collection of 1,100 pathologic specimens contained many that exhibited depositions of calcareous material, and since then the investigations have shown that the gouty diathesis is an important factor. Several cases were reported as occurring consecutive to inflammatory rheumatism, which revealed the identical pathologic changes of arthritis deformans, in the stapes articulation.

DIAGNOSIS.

The diagnosis of capsulitis labyrinthi is made by the exclusion of the other forms of progressive deafness, the objective signs, the subjective symptoms and the functional test with tuning forks. This group, then, may be recognized by the familiar signs of sclerosis, such as normal tympanic membrane (with perhaps diffuse or circumscribed opacity). The handle of the malleus may be slightly retracted, but is not rotated upon its axis. Now and then a red area is visible through the tympanic membrane, which is indicative of hyperemia in the region of the promontory, serving as strong corroborative evidence. Inspection of nose, pharynx and mouth of Eustachian tubes reveals normal conditions. The auscultation by catheter demonstrates that the Eustachian tubes are pervious, and the tympanic cavity unobstructed to air and free from secretion. The objective signs scarcely show a

departure from normal conditions, and do not indicate the high degree of deafness which is usually present. This fact led an author to the facetious definition that sclerosis is a disease in which the physician sees nothing and the patient hears nothing. Fortunately, the subjective symptoms, the family history and the functional test with tuning forks are of great diagnostic value, enabling the careful aurist to recognize sclerosis, even in its early stage.

The subjective symptoms are high degree of deafness, usually of both ears and of insidious origin, more often between the ages of 20 and 35. Some acute pain and sensation of pressure and numbness around the head are felt. Persistent and distressing tinnitus, accompanied at times by detonating noises and some vertigo. Paracusis Willisi is nearly always present. Inheritance plays an important role in this group. In half of this group, some immediate member of the family is affected, seventeen per cent. originating at the puerperium.

It is important for diagnosis to eliminate all other forms of progressive deafness, such as arise from industrial pursuits; the constitutional anomalies, such as leukemia and hereditary syphilis, likewise the deafness following the acute and chronic infectious diseases; neoplasm of the tympanic cavity, and also the nervous diseases implicating the acusticus. The deafness of old age is also to be excluded, as it is not due to an osseous formation, but rather to an atrophy of the acusticus. Most important is the exclusion of catarrhal and suppurative diseases of the middle ear and the Eustachian tubes, since relatively the same functional test applies to them. The objective signs of the suppurative class, in contradistinction to sclerosis, are marked, except when co-existent. These are the retraction of the tympanic membrane, the handle of the malleus being rotated upon its axis, the evidences of former inflammation and suppuration, which may be adhesions, a cicatrix, a perforation of the drum-membrane, or calcareous deposits. The inability of the tympanic membrane, as seen with the otoscope, also the history of the patient and the absence of paracusis Willisi. These factors, together with an improvement of the hearing upon inflation, will aid in the differential diagnosis.

FUNCTIONAL TEST.

By the functional examination with the tuning-fork, we are enabled to measure the intensity and duration of a given tone. Through two avenues, by air and bone, may be discovered diseases of either the sound-conduction or the sound-perception apparatus. It will be remembered that the human ear is capable of perceiving a note as low as twelve vibrations per second, but the average normal low-tone limit is C_2, the equivalent of sixteen vibrations per second, while the highest note heard by the normal ear is g^8, or the equivalent of about 50,000 vibrations, comprising in all eleven octaves of tone. Experiments prove that the chain of ossicles and drum-membrane are requisite for the conveyance of the lower tones, the higher notes finding more ready ingress through the bone-channel. Through the agency of antagonistic forces, the sound-conducting apparatus, that is, the tympanic membrane and chain of ossicles, is held in a state of perfect equilibrium. This is accomplished by the musculus tensor tympani, the stapedius aud the muscular fibres of the tympanic membrane, which, together, prevent excessive tension and relaxation. In consequence, the sound-waves are conveyed more effectually through the æreo-tympanic channel than the osseo-tympanic channel. A disturbance of this exquisite state of tension—as by closure of the eustachian tubes, by adhesive bands, by perforation of the drum-membrane, or an osseous or membranous formation causing fixation of the stapes—will result in an alteration of the normal sound-conduction. That of the bone may exceed that of the air-channel. The extent of such interference with the function of the sound-conducting apparatus may be determined with the aid of tuning-forks. There exists in all cases of rigidity or fixation of the ossicles a defect in the perception of the lower tones by air-conduction. This defect of perfection may range from one-half to one and a half octaves of the lower tones, depending upon the degree of deafness, while the bone-conduction is prolonged. The diseases of the cochlea, disturbing the sound-perception apparatus, are evidenced by the defective hearing of the high notes through air and by diminished bone conduction. The translations of the highest notes are supposed, according to the theory

of Helmholtz, to take place in the lower region of the cochlea, in the narrowest portion of the basilar membrane. Hence, the locality and the extent of the disease may be estimated by the defect in the perception of high notes. With the aid of Schwabach's and Rinné's tests and the determination of the lower-tone limit, it may be ascertained whether or not fixation of the stapes exists. This can be almost positively shown by the Bezold triad test. These are, first, prolonged cranial bone conduction with an A fork; Rinné's test, shortened or negative, with a^1 fork; third, defect in perception of one-half to one and one-half octaves of lower tones. When the labyrinthian structure is exclusively invaded, the same test applied will react with almost opposite results. First, shortened cranial bone-conduction with a^1 or A fork; second, Rinné's test, positive or very little shortened; third, clear perception of nearly all the lower tones; fourth, defect in hearing the high tones. Thus, the same process may, according to the location, produce a bony ankylosis or nervous deafness, and may be diagnosed by the different tests. The accuracy of these tests cannot be questioned; diagnoses of stapes ankylosis and nervous deafness, made in vivo, have been sufficiently verified by autopsy examinations. In more than half of the cases the process was found localized on the vestibule side of the oval window, and affected the lower turn of the cochlea. The extent of the invasion of this part of the labyrinth may be determined by the defect in perception of the high tones. An extensive co-existence of the bone formation in the ossicles and labyrinth renders the differential diagnosis almost impossible. In that event, they may be classified as dysacusis. In this category also belong the one-sided deafness, where the normal ear of the opposite side interferes with the examination of bone-conduction, and all such cases where insufficient data are obtained, as from children and the weak-minded. The term sclerosis is suitable when applied to the sclerotic condition of the mucous membrane of the tympanum, the oval and round window, but is insufficient when an osseous formation exists, as the latter is an increase rather than a decrease of tissue. A more precise definition would be capsulitis labyrinthi, complicated by either stapes fixation or nervous deafness.

When a combination of both exists the case could be classified as simply deafness or dysacusis. The term spongification, introduced by Siebenmann, is as appropriate as capsulitis labyrinthi, but does not convey so precisely the point of origin.

TREATMENT.

The discovery that an osseous process, and not catarrhal disease, is the fundamental cause of sclerosis gives direction to our therapeutic efforts. The mechanical, the surgical and the medicinal treatment of sclerosis have been faithfully tried, but with unsatisfactory results.

The medicinal treatment of sclerosis, with a view of causing removal of the materies morbi obstructing the ossicles by the internal use of absorbents, such as iodin, mercury and phosphorus, has given only negative results. The most promising has been the use of phosphorus in small doses, administered for periods of six months during the year. The thyroid extract was given with some satisfactory results in the early stages of the disease, due probably to the absorption of the granular tissue, which precedes the osseous formation. An early diagnosis of progressive deafness in subjects predisposed by heredity will permit proper hygienic and medical treatment. The use of large doses of potassium iodid has been found efficacious in the hands of Politzer. The administration of potassium iodid should be continued for a period of three months, or longer, during the year. In cases where the rheumatic diathesis is a causative factor the use of solvents for uric acid is indicated.

MECHANICAL TREATMENT.

This consists of mobilization of the chain of ossicles, which, if not excessive, may temporarily benefit the hearing. This is brought about principally by transudation of serum, following massage, which facilitates the movement of the articulation of the ossicles. The effect of excessive pneumo-massage by the use of rarefacteurs is exerted principally upon the posterior segment of the tympanic membrane, the fibres of which become weakened, resulting in relaxation of the drum membrane. The condition induces not only increased tinnitus, but also a

decrease in the hearing power. Pneumo-massage should be given only for one-half to one minute, twice or three times per week for one or two months. The patient should be advised to return after a period of two months for another course of pneumo-massage. Dr. Blake emphasized the necessity of gentleness in the use of the rarefacteur, as it is apt to provoke a misplacement in the whole chain of ossicles, more particularly a relaxation of the posterior segment of the drum head. When this condition exists, Dr. Blake resorts to an application of collodion to the relaxed portion of the tympanic membrane with the view of contracting the parts and thus restoring equilibrium.

Surgical measures, such as stapedectomy, excision of oval window and other procedures, have proven of temporary benefit only. It was found that the trauma of the operation induces a migration of plastic material, which later organizes into a cicatrix and frequently renders the condition for hearing worse. Equally ineffective has been the local treatment, by forcing irritating substances, such as iodin, silver and solvent solutions, into the tympanic cavity. It has been condemned on the theory that the irritation produced an increased periosteal cell proliferation, an exception to this being when catarrhal disease and sclerosis co-exist. A prophylactic procedure is the removal of diseased tonsils in the pharynx and vault, upon the theory that suppurative processes induced primarily by the diseased tonsils are frequently followed by deposits of calcareous matter, which in later life may initiate ossification of cartilage in those subjects predisposed by heredity to capsulitis labyrinthi.

It is doubtful if the osseous hyperplasia of advanced sclerosis can be removed by any agent now at our command. The cell-stimulating and absorbent effects of the X-ray and the violet ray upon lupus and inoperable malignant tumors have led the writer to institute experiments with these agents in cases of sclerosis and chronic otitis media.

SUMMARY.

1. Sclerosis is fundamentally a hyperplasia of the bony capsule of the labyrinth; the hyperplasia is a transforma-

tion of cartilage into bone, i. e., metaplasia, accompanied by formation of outgrowth of bone, i. e., hyperostosis.

2. It is initiated by constitutional diathesis, such as inflammatory rheumatism, gout, syphilis and scrofula, by diseased tonsils in the pharynx and vault, suppurations with calcareous deposits in the tympanic cavity, exposure to cold and wet and injury.

3. Its localization is usually in the labyrinth capsule near the stapes articulation with the oval window, inducing fixation of the ossicles.

4. It may involve also the semi-circular canals and cochlea, to produce symptoms of nervous deafness.

5. It may affect simultaneously the sound conduction and the sound perception apparatus.

6. The functional test, the subjective symptoms and family history permit an early diagnosis of this disease. These are:

1. Hyperemia of promontory.
2. Heredity.
3. Schwabach test reveals prolonged bone conduction.
4. Rinne's test is negative in varying degree.
5. Defective perception of one-half to one and one-half octaves of the low tones.

7. Probably ten per cent. of the middle ear diseases are true sclerosis and are designated synonymously capsulitis labyrinthi, oto-sclerosis, spongification, dry middle ear catarrh and otitis media insidiosa. The therapy is effective in early stages of the disease by hygienic and medicinal treatment. The more advanced cases may be improved by judicious treatment, with amelioration of tinnitus.

27 East Adams Avenue.

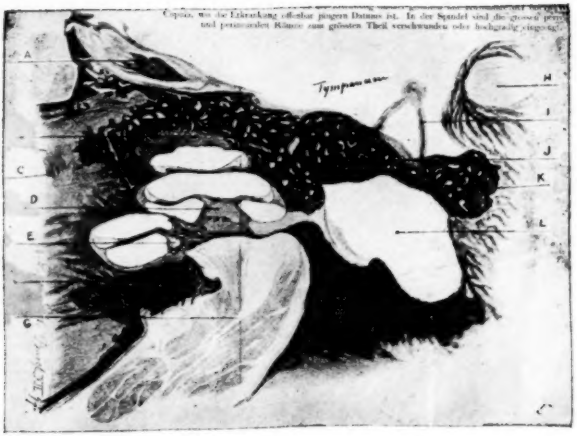


Fig. 1.—Horizontal section through the labyrinth in the region of stapes and upper portion of cochlea.—Siebenmann.

A—Tensor tympani.
B—Capsule of cochlea.
C—Normal bone.
D—Central axis of cochlea.
E—Ganglionic canal.
F—Hyperplasia of bone.
G—Acusticus.
H—Facial nerve.
I—Stapes (ankylosed).
J—Stapes, foot plate (ankylosed).
K—Hyperplastic bone.
L—Vestibule.

Patient was a physician 46 years old. Deafness in both ears at his 20th year. Father and two brothers deaf. No history of otitis media. Some vertigo and tinnitus.

Diagnosis in vivo: Nervous deafness.

Watch heard 1 cm. on right side.
Watch " " " " " by pressing only.
Watch " through bone clearly from all points.

Microscopic Finding:

Hyperplasia of capsule of labyrinth with exostoses in pelvis ovalis. Bony fixation of stapes on vestibular side. Hyperplasia of the cochlea, capsule, with proliferation of the perineural and perivascular connective tissue in the lower basal turn of the cochlea.

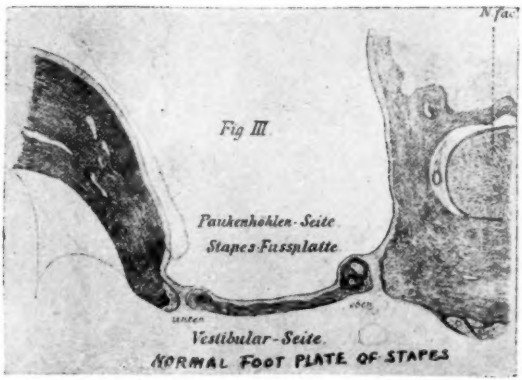


Fig. 2. Vertical section through foot plate of stapes (Bezold).

Male 24 years old, deaf in both ears since 17th year. Brother and sister likewise deaf.

Diagnosis in vivo: Sclerosis.

The functional examination revealed the following:

Schwabach's test, A fork, prolonged 19 seconds.

Rinné " a' fork negative { R. 9 " / L. 10 "

Lower tone limit { R. c. 64 V. / L. F. 85 V.

Whisper { R. 6 cm. / L. 25 cm.

Microscopic Finding:

Hyperplasia of bone of foot plate of stapes. Ankylosis of stapes. labyrinth and tympanic cavity are normal. Fig. iii shows normal size of foot plate for comparison with Fig. ii, which is five times enlarged by the osseous formation.

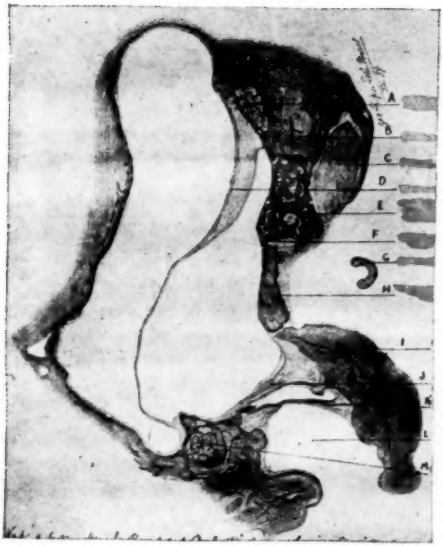


Fig. 3. A vertical section through the round and the oval window. —Siebenmann.

A—Utriculo-ampullaris nerve.
B—Normal bone.
C—Facial nerve.
D—Macula utriculii.
E—Hyperplasia of bone.
F—Ankylosis of stapes.
G—Caput stapedis.
H—Thickened foot plate of stape.
I—Promontory.
J—Lamina spiralis.
K—Tympanic membrane second.
L—Niche of round window.
M—Ampullaris posterior nerve.

Patient was 60 years old, totally deaf on both sides; began during exposure in war at age of 25 years. Functional examination was not made. Hyperplasia of the capsule of the labyrinth involving the stapes with incomplete ankylosis. The upper margin of the oval window has a bony union, whereas the lower margin is free. The plate of stapes is much thickened.

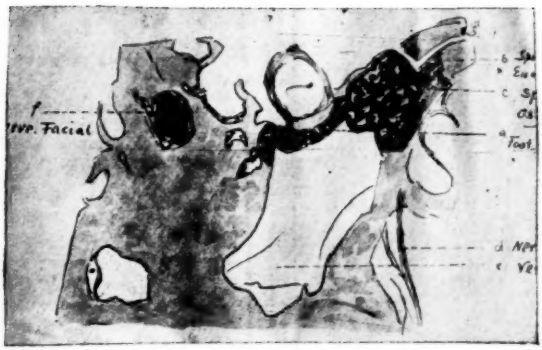


Fig. 4. Horizontal section through ankylosed stapes and hyperplastic bone of the capsule of labyrinth.—Katz.

a—Foot plate of stapes.
b—Hyperplasia of bone reaching to endorsteum of cochlea.
c—Hyperplastic bone involving the foot plate of stapes, causing complete ankylosis.
d—Vestibular nerve.
e—Vestibule.
f—Facial nerve.

The above specimen was obtained from a woman of 39 years of age, who was very deaf, suffering from tinnitus. She had never had otitis media, but had been affected with rheumatism. Family history and functional test were unobtainable.

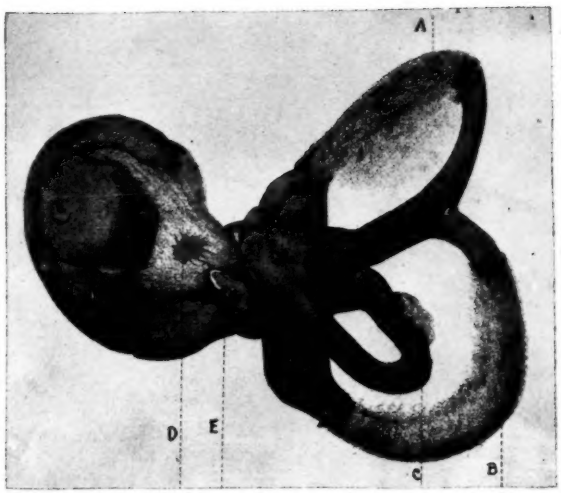


Fig. 5. Hyperplasia of semicircular canal and cochlea.—Siebenmann.

A—Superior semicircular canal.
B—Posterior " "
C—Lateral " "
D and E—Ankylosis of stapes.

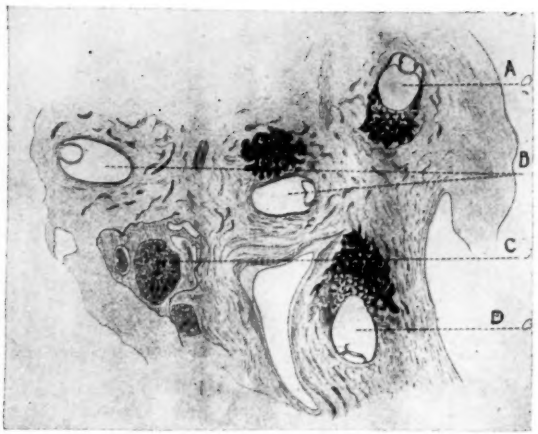


Fig. 6. Hyperplasia of semicircular canals, showing areas of retraction.—Siebenmann.

A—Posterior canal.
B—Lateral "
C—Facial nerve.
D—Posterior canal.

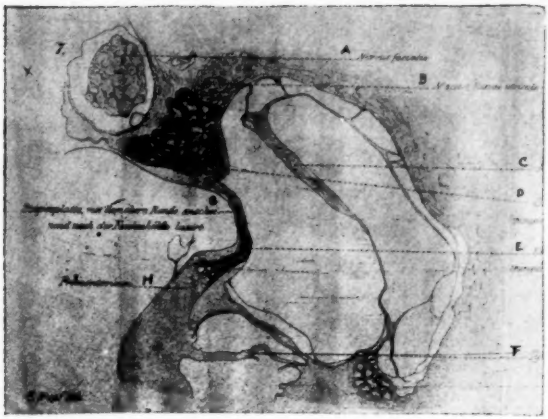


Fig. 7. Hyperplasia in the region of oval window and stapes articulation.—Siebenmann.

A—Facial nerve.
B—Utriculo-ampullaris nerve.
C—Macula utriculi.
D—Upper portion of oval window, showing hyperplasia of bone with slight exostosis into the vestibule.
E—Hyperplasia of bone causing ankylosis of foot plate of stapes.
F—Tympanic membrane second.
G—Base of the stapes dislocated toward the tympanic cavity.
H—Promontory.

Figs. 5, 6 and 7 represent sections obtained from one subject in whom the hyperplasia affected simultaneously the stapes, the cochlea and the three semicircular canals. The case was a woman aged 52, who had been deaf for five years. Father had also been deaf, She suffered from vertigo without vomiting and pain in ears. Tympanic cavity, drum membrane normal.

Diagnosis in vivo: Progressive nervous deafness.
Schwabach test shortened 10 seconds.
Rinné test, positive 25 seconds.
Whisper { R. 4 cm. / L. 150 cm.

Lower tone limit could not be determined owing to impending death.

Microscopic finding: Hyperplasia of bony capsule of the three semicircular canals and cochlea, involving the foot plate of stapes. Formation of exostosis on vestibular and tympanic surface of the oval window, causing dislocation of the stapes on one side, while the other shows evidences of commencing ossification of the cartilaginous covering of the stapes.

LVIII.

NOTES ON THE RADICAL MASTOID OPERATION.

By Chevalier Jackson, M. D.,

PITTSBURG, PA.

Otologists are approaching an agreement that: When, in the absence of mastoid symptoms, suppuration has continued three or more months after ossiculectomy followed by wick treatment, the radical tympano-mastoid extenteration is indicated not only for the cure of the discharge, but to put the patient's life out of jeopardy.

The dissensionists from this view are growing fewer every year. Their only worthy contentions are these two; first, hearing may be adversely affected and, second, the discharge is not always cured. These contentions are based on failures. An analysis of the causes of failure leads the writer to class them under the following heads:

1. Failure to remove all diseased tissue.
2. Neglect of after-treatment.
3. The combination of a closed retro-auricular wound with a small meatal aperture.

Failure to remove all diseased tissue is due to losing sight of the object of the operation and confusing it with the object in acute mastoiditis. The operator's first cases are apt to be acute ones. He opens a thin cortex, gingerly curettes out an abscess in communication with the antrum, inserts a gauze drain, which is renewed every day or two, and in a couple of months the case is well. This is bad surgery in even the acute case, but the worst effect is that the surgeon is apt afterward to attack a chronic case in the same careless way, and certain failure results. The experienced surgeon knows that the radical operation must have purely a pathologic basis. Every carious spot must be followed until nothing but healthy, as well as smooth, bony or other tissue walls the cavity on every side.

In making the Stacke meatal flaps, the surgeon hesi-

tates to encroach upon the concha, and the result is too small an opening for efficient after-treatment, especially where exuberant granulations tend to run riot. Körner's flaps yield a capacious opening, and a cure of the discharge may always be looked for if all disease has been thoroughly eradicated. But the Körner's flaps, or any other meatal flaps, if they are cut far enough into the concha to leave an adequate opening for efficient after-treatment, leave a gaping meatus that amounts to a deformity. This deformity is sometimes quite obtrusive as compared to a depressed scar, or even a permanent opening post-auricularly. This is, of course, of most importance in the case of women, who would rather have a hideous scar or opening back of the ear, where it can be hidden, than the slightest noticeable departure from the normal in a natural feature like the concha. They are apt to have the poet's "pink shell" as an ideal. Another drawback to this mutilation of the concha is the occasional occurrence of perichondritis of the pinna, with its resultant atrophy and disfigurement. A case of very great deformity occurred in the writer's practice, where infection occurred by the patient tearing off the dressings while intoxicated. The shrivelled auricle is pointed to as a "Jackson ear." All the deformity is attributed, not to the patient's intoxication, but to the lack of skill on my part. Any attempt to get along without a large meatal aperture, with conchal incision, will result in troublesome after-treatment and a certain percentage of failures to stop the discharge. It will be a battle against exuberant granulation, pus pockets, stenosis, crusts, scales, dermatitis, and relapse, if it be a case of cholesteatoma.

All these considerations drift the writer's preference toward letting the meatus and concha alone and healing up the retro-auricular wound from the bottom, allowing it to close (or closing it) only after the entire wound cavity, including the antrum, is filled and covered in with a thick layer of firm, fibrous connective tissue, obliterating everything except the newly enlarged and sloped tympanic cavity. This cavity is covered, not with true skin, but with cornified mucous membrane, such as in cases cured by ossiculectomy, and it is situated at the fundus of the normal external auditory canal. That to this is due the ex-

cellent hearing retained in his later cases, the writer is certain, though no opportunities for microscopic examination of the conditions about the foot plate of the stapes and the oval window have occurred.

If the meatal flap method be abandoned, some other way of hastening the healing must be adopted. The plan followed by the writer is shown in the cut. The object sought is to obtain large, thick skin flaps which shall not only furnish epidermis, but, by their bulk, shall help fill the large cavity. The line AB, Fig. 1, represents the original incision, which is made a centimeter or more back of the attachment of the auricle. This leaves a margin between the auricle and the wound, which, being drawn forward (along with the auricle) during the operation, afterward slides backward so as to partially overhang the crater-like

Fig. 1

Dotted Lines Locate Flap Incisions.

wound cavity in the bone shown by the dark shading in the sketch. This overhang is formed into one or two flaps (C D) by paralleling the original incision with another close to the auricular attachment, as shown by the dotted line, and supplementing this by a cross cut. If only one flap is desired, the cross cut is high up at the upper margin of the bone cavity; if two flaps are preferred, the cross cut is at the middle of the bone cavity. If the upper wall of the bony wound is abrupt, one flap is preferable, and is tamponed into the floor of the wound. If the upper wall is sloping, the cross cut is made on a level with the centre of the bone excavation. The two flaps are tamponned tightly against the bone (Fig. 2), where they attach themselves, helping to fill the cavity by their bulk and furnishing a source for prompt epidermal extension. The original incision, AB, should not be so far back that the flaps are likely to contain hair follicles, nor so far forward as to

enter the cartilage. A very narrow flap is sufficient in some cases only two millimetres wide, though from one to two centimetres is better if the cavity be large. In some cases the first incision was so far back that the posterior flap did not require elevation or retraction. It is not necessary that the flaps shall be so extensive as to cover all the granulating surface. To furnish large nuclei for the spread of epidermis is really sufficient. Ordinarily the epidermis must extend inward from the skin edge of the wound; if we lay in a flap, be it ever so narrow, it furnishes a greatly increased edge for extension. Still, the broader the flap, the quicker the completion of healing. It might be supposed that the hastening of the epidermal ex-

Fig 2

Flaps in Position.

tension would make the resultant scar deeper, because of the completion of epidermization before there has been much filling in from the bottom by fibrous connective tissue. Clinically, however, we find this is not the case, as shown in Fig. 3. In some cases the skin flap was cut and turned in at the time of operation, but in other cases it was deemed better to wait until the bone was covered with small, firm, healthy granulations before making the flaps by incising, as shown by the dotted line. Then, the under surface of the flaps also presented a healthy granulating surface, which was always found to have adhered to the bone on removal of the tampon two days later. The depth of the wound beyond the ends of the flaps (which, by the tamponade, must be kept widely away from each other) rapidly fills with connective tissue, which is covered by epidermis extending from the free ends and edges of the flaps.

In the method of operation here advocated, if there has been no previous ossiculectomy, the membrana tympani and ossicles or their remnants are removed through the

meatus as the first step. The entire posterior wall of the bony meatus is removed, except so much at the inner end as is necessary to avoid risk of injury to the facial nerve. In sclerosed mastoids this wall is removed with the chisel in driving an entry into the antrum. In pneumatic or necrotic mastoids, with cortices of no abnormal thickness, the antrum is entered first and the posterior meatus wall removed rapidly with the rongeur. The mastoid cells, antrum and tympanum are converted into one continuous cavity, but the membranous meatus is neither split nor excised. A notch is punched from it with Myles' ethmoid forceps to insure a free passage between the wound cavity and the tympanum in the early stages of the healing. Leaving plenty of space here lessens the likelihood of cicatricial bands about the oval window, binding down the stapes—especially likely to happen in petrous necrosis, involving the margin of the oval window. The mastoid cells are obliterated, whether diseased or not, and the outer attic wall is removed, and the whole bony cavity is rendered smooth and even free from disease. The cortex should be cut away (after the antrum is entered) as widely as possible, so as to make the most gradual possible slope into the antrum, with the largest possible external orifice. On this the flaps and the extending epidermis rapidly make a smooth, sloping "skin" surface, sinking toward the dimple in the centre. Of course, if the bony wound were very small, like that made by a drill, the flap or flaps might interfere with drainage, and exuberant granulations might be troublesome; but such an opening is not contemplated in a tympano-mastoid extenteration. It is the filling in of a large cavity in the bone with which we are concerned. The plan here recommended for rapid healing must not be combined with the Stacke or other operations that involve the slitting or excision of the membranous canal, as this would result in a permanent opening behind the auricle, a condition rarely called for. There is no need of extirpating the membranous meatus, as in the Schwartze operation, nor of withdrawing and then replacing it, as in the Stacke operation. It is usually sound, healthy tissue, and from its posterior surface healthy granulations spring. In the writer's method it forms the anterior wall of the post-auricular wound, the healing of which it hastens by

lessening the size of the cavity to be filled by flaps and granulations.

The statement is often made by operators that their Stacke or Schwartze-Stacke operations are well in from three to six weeks. The writer must confess to the inferiority of his results. At the end of this time the meatal flaps are attached, but he has never seen a Stacke or Schwartze-Stacke case that was completely epidermized and dry, so that it could be safely discharged from all oversight short of three months, and he knows of one very competent otologist who is still working at a case operated thirteen months ago. By the writer's method healing has been secured in one case in seven weeks, in another two months. The average duration was ten weeks and the longest four months. The half-tone engraving is from a photograph of a case that healed in two months after a complete tympano-mastoid exenteration. The patient, a woman of 45 years, had otorrhea since scarlatina in childhood. Intra-tympanic syringing, dry treatment, wick treatment and ossiculectomy, bettered, but did not cure. There were no mastoid symptoms. Operation was consented to on the promise of probable cure. Eburnation had obliterated all the pneumatic spaces except the antrum, which was small, filled with pus and granulations, and its walls were carious. The posterior superior wall of the bony meatus had been chiseled away in driving an entry into the antrum. All diseased tissue was removed; two skin flaps by the writer's method were made at once. The healing was unusually prompt, the discharge has never returned. The photograph taken some months after the healing shows the smooth, even, dimpled scar.

The writer has been asked why he removes the posterior bony meatal wall if no meatal flaps are contemplated. The removal is to facilitate the ablation of the outer attic wall and the inspection and cleansing of the attic, as he does not believe these can be efficiently accomplished with the outer wall of the aditus in place. The necrotic remnant of the incus, which has escaped the ossiculectomy is occasionally a gratifying find in this part of the operation. Rarely both incus and malleus will have to be removed in this way on account of stenosis of the canal.

The writer's conclusions may be epitomized as follows:

1. When in the absence of mastoid symptoms, suppuration has continued three or more months after ossiculectomy followed by wick treatment, the radical tympano-mastoid exenteration is indicated not only for the cure of the discharge, but to put the patient's life out of jeopardy.

2. The only worthy objections to this rule are two: Hearing is occasionally adversely affected, and the discharge is not invariably cured. These objections are based on failures.

3. Failures are due chiefly to three causes:

a. Failure to remove all diseased tissue.

b. Neglect of after treatment.

c. The combination of a closed retro-auricular wound with a small meatal aperture.

4. An adequate meatal aperture can only be secured in the Stacke, Körner, Pansa and similar operations by extending the flap incisions far out into the concha. A better method is Körner's. Either method will leave a gaping meatus amounting to deformity.

5. Any attempt to get along without a deformedly enlarged meatus will result in troublesome after treatment and an occasional failure, especially in cholesteatoma.

6. A large posterior scar, even a permanent retro-auricular opening, can be hidden easily in women, and even in men is far less obtrusive than even the slightest deformity of a natural feature like the concha. Occasionally perichondritis is the result of local infection, or constitutional dyscrasia may result.

7. For the foregoing and other reasons, it is better to let the concha and cartilaginous meatus alone and to heal up the retro-auricular wound from the bottom, allowing it to close, or closing it, only after the entire wound cavity including the antrum is filled and covered in with a thick layer of firm fibrous connective tissue, obliterating everything except the newly enlarged and sloped tympanic cavity. This cavity is covered not with true skin but with cornified mucous membrane, such as in cases cured by ossiculectomy, and it is situated at the fundus of a normal external auditory canal. It is the writer's opinion that this accounts for the bettered audition in his latter cases.

8. The most satisfactory operation in the writer's experience may be summarized as follows:

a. Removal of the membrana tympani and ossicles through the meatus.

b. A curved incision, a centimetre or more behind the auricle, so that when released from the retractor after the bone ablation, the post-auricular skin will overhang the bony wound cavity. The incision commences just back of the temporal artery to allow ample retraction of auricular flap forward and downward.

c. Ablation of mastoid and removal of the posterior osseous meatus wall in the usual way, with the widest possible wound diameter at the cortex.

d. Another incision close to the auricle, the tissue between this and the original incision forming, when divided over the centre of the bone cavity, two tongue-like flaps, one hanging down from above, the other projecting upward from its attachment below. These are then tamponed into the wound against the upper and lower walls respectively. These skin flaps may be made either at the original operation or a week or two later after healthy granulations have covered the bone and the under surface of the flap. In the latter case the deeper portion of the bony wound is plugged with gauze to prevent its being filled with blood. After bleeding has been checked with hot sponging, the packing is removed and the wound is sponged dry and repacked, the outer portion of the packing being formed into a firm cone that is firmly pressed into the wound by a roll of gauze and a tight bandage. The flaps will be found attached at the next dressing, forty-eight hours later. When it is preferred to make the flaps at the original operation, as in cases free from petrous or intracranial involvement, and surely cleaned out, it is a great advantage to have carefully elevated the periosteum (if healthy) with the anterior flap—not to have it scraped away in shreds as is often done. In some cases, however, this will make too thick a flap; in such it may be necessary to clip away the under surface of the flaps to make them taper down to nothing at their inner extremity. If the upper wall of the bony wound be chiseled abruptly inward from the cortical surface, without any slope, as is often done, it is necessary to make but one flap. This is done by making the cross cut at the top of

Fig. 3.

the bony wound, leaving a long tongue-like flap to be turned in on the floor of the wound.

A motor-driven burr, as advocated by Macewen, is undoubtedly the best tool for leaving a smooth surface upon which granulation buds and pathologic spots are quickly discernible, and which is followed by rapid and smooth healing; but the motor-burr in addition to its slowness, has two almost insurmountable objections, its bulk and weight limit, its use to one particular operating room; and its hand piece and shaft are practically unsterilizable after they have been spattered and bedaubed with blood and pus. To put them into a steam sterilizer is to ruin them, and gaseous formaldehyde sterilization is inconvenient and unreliable, unless preceeded by a thorough mechanical cleansing with soap and water, which would very soon

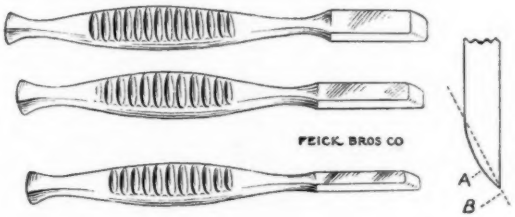
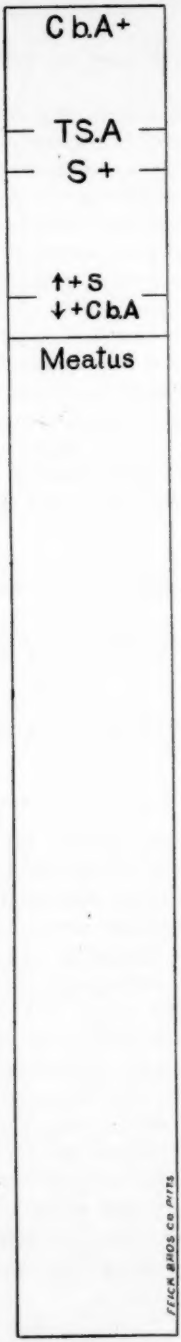


Fig. 4. Round Cornered Chisel with Rounded Basil.

ruin both shaft and hand piece. Of course no one questions the thoroughness of Macewen's technic, but to be certain of asepsis with any shaft and hand piece yet obtainable, requires personal care and supervision, while chisel and mallet will always be placed before him, rendered unquestionably aseptic by the regular routine. In some other respects the gouge and chisel are open to criticism, especially the forms in use. The carpenter uses a chisel mostly for making a square cornered hole called a mortise. For him a square cornered chisel is a necessity. The mastoid operator never desires a square hole and to him the square chisel corners are an objection. The gouge has no corners, but it leaves a groove in the bone. Any operator who will try the round cornered chisel with rounded basil, shown in Fig. 4, will probably abandon the sharp cornered chisel altogether and will use the gouge



Fig, 5. Otologists Rule for Reed's Line.

very little. It does not leave a groove like the gouge. It flakes off the bone as smoothly and much more rapidly than the rotary burr. It differs from Lucae's chisel which has a flat basil, angular corners, an edge the arc of a circle, and it leaves a groove in the bone. The writer's chisel has rounded basil, rounded corners, a straight edge, and it leaves a flat, smooth track. The foregoing is intended to apply especially to the opening of eburnated mastoids. For the thin cortex usually encountered in acute mastoiditis almost anything will do. It will be found better than any instrument in use for flaking off the outer layer of

Fig. 6. Aseptable Trephine with Ratchet Handle.

bruised, infiltrated and dirt-ingrained bone in skull injury cases, as it does not leave a groove nor does it have sharp corners. The form of its basil enables the surgeon to run the shaving out thicker or thinner at will, the depth and length of cut being under perfect control, the result being always a smooth track tapering off at the surface to nothing in every direction. General surgeons who have tried it all commend it.

The trephine, shown in Fig. 5, will be found to have an advantage over the forms in use on account of its simplicity, rapidity of cutting and ease of cleaning. It can be taken completely apart, and it has no uncleanable hollow shank or hollow handle. The point, sliding in an outside guide, can be moved to-and-fro as easily as in the dirty, old

fashioned instrument that belongs to a by-gone age. The ratchet will seem awkward to surgeons who are used to the old to-and-fro motion. For such the ratchet can be locked. But driving the crown continuously in one direction by the ratchet greatly increases the rapidity of the cutting, and tends to throw the sawdust up the lateral grooves and out. In some of the intracranial cases encountered by the otologist, rapidity of cutting is a great neces-

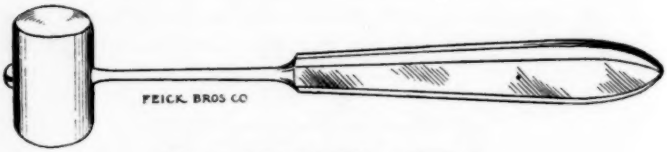


Fig. 7. Mallet for Mastoid Work.

sity. Rapidity in cutting does not endanger the dura more than slowness. It simply requires shorter intervals between examinations of the cut.

The rule (Fig. 6) for laying off points from Reed's base line will be found convenient, as it has only points of otologic interest, namely, trephining points of election for temporo-sphenoidal abscess, cerebellar abscess and the lateral sinus.

LIX.

SIMPLE ULCERATION OF THE VOCAL CORDS, WITH REPORT OF CASES.*

By Wendell C. Phillips, M. D.,

NEW YORK CITY.

A careful study during the period of about twelve years of a private patient suffering apparently from occasional attacks of simple catarrhal ulceration of the vocal cords, has been of such interest to me as to make it seem worth while to present his history for the consideration of the members of the section. The patient, Mr. B——, first came under my treatment in 1891, having been referred to me by his family physician, who thought there might be a commencement of some serious disease of the larynx. Mr. B—— is a splendidly developed and apparently a perfect specimen of humanity, with no bad habits and no history of any organic disease. His family history was good, excepting that an older brother died from tubercular disease. He uses tobacco and alcohol in great moderation. At that time he was suffering with dysphonia to a slight degree and very slight hoarseness. There was no cough and but little expectoration. This condition seemed to have resulted from taking cold. There was no rhinitis, but there was a large septal spur. His naso-pharynx and pharynx were slightly congested; his temperature was normal. Laryngeal examination revealed what appeared to be a moderately large nodule, located about the junction of the middle and posterior thirds of the right vocal cords, about over the processus vocalis, a small surface of which was denuded of membrane, presenting all the appearances of a small ulcer about one-fifth of an inch in diameter. From this ulcer bloodvessels could be seen radiating in every direction. Aside from a very slight amount of in-

*Read before the Section of Laryngology and Rhinology of the N. Y. Academy of Medicine, April 23, 1902.

filtration about the edges of the ulcer there was no infiltration anywhere in the larynx. The arytenoids were perfectly normal in appearance and there was no epithelial hypertrophy or wart-like looking eminences in the posterior commissure.

The ulceration was very superficial in character, apparently involving only the mucous membrane. There was no loss of voice, but some slight interference with the resonance. The subglottic space was nearly normal. There was almost no secretion. The mobility of the cords was not interfered with. The treatment at that time consisted of applications of nitrate of silver to the ulcerated surface, the administration of small doses of iodid of pottash and, so far as possible, rest from talking. This treatment was carried out for two or three weeks with some improvement, when he was called upon to take a trip South, to be gone about three weeks. Upon his return the ulceration had entirely disappeared, but there still remained a small nodule, which later on disappeared altogether. At this time I removed the septal spur, hoping that its removal might result in no further attacks. This, however, did not prove to be the case, as since that time he has passed through a similar experience four times. The treatment during these attacks has been the same each time and as soon as possible I have sent him upon a trip usually to Bermuda (by boat) and he has returned entirely well. In no instance have I been able to determine definitely any specific cause. They have never seemed to me to be due to taking cold, and with the exception of the last attack, over-using or straining of the voice, could not have been the cause. The last attack came on in November, 1901, the day after election. For three weeks previously he had been using his voice steadily in making political speeches, both in and out of doors. It came on suddenly and with the usual history, except that it was more severe than the former attacks and both cords became involved, each having a good sized nodule, which broke down and ulcerated. His recovery was slow and only became complete after a trip to Bermuda.

This case has been very interesting to me and I have come to believe that the cause must be laid to climatic influences, as I can account for this condition in no other

way. To be sure his last attack might be due to overstrain, but it only differed from the others in that it was more severe, and it is quite probable that the severity of the attack only may be attributed to voice strain. I have not had time to go over the literature of this subject, but a glance at a few books has led me to think that but little has been written upon it.

Bosworth states (Diseases of the Nose and Throat, in his Chapter upon Chronic Laryngitis, Vol. 2, page 521): "When these small bloodvessels arrange themselves in the form of a small circle, it is liable to present the appearance of a minute erosion or ulceration, thus encouraging a somewhat prevalent impression that an erosion may occur in a chronic laryngitis." The cords are slightly swollen and present certain irregularities, not only on the surface, but on the edges, the result of a somewhat irregular epithelial proliferation. This is apt to be most marked in their posterior portion and especially in the neighborhood of the vocal processes of the arytenoid cartilages. He further says: "I have never in a single instance seen any condition in the larynx in this disease which warranted the assertion that there was sufficient denudation of the mucous membrane to constitute a genuine erosion."

Kyle, Diseases of the Nose and Throat, says: "During the course of simple chronic laryngitis, superficial ulcerations may take place, or more likely localized spots of desquamation may appear, most commonly between the arytenoid cartilages. The ulcers, however, may involve deeper structures, followed by organized granulation tissue or trachoma."

I have already remarked that the ulceration in my patient has always been exceedingly superficial, the edges of the ulcer not being much elevated and almost no burrowing underneath, but that the mucous membrane was destroyed there was no doubt.

I am indebted to Dr. Joseph A. Kenefick for brief histories of the following two cases, both seemingly similar to my own.

CASE I.

(Dr. J. A. K.) In the White Mountains, 1890, had a

severe attack of influenza, which involved the whole respiratory tract, causing complete aphonia. Resolution of the inflamed cords took place very slowly, leaving, eventually, a chronic laryngitis with ulcers over both processi vocales. These refused to heal during the early following winter, and he was finally compelled to leave Boston and go to Lakewood. After a month at Lakewood he returned to Boston, much improved, and, under special treatment, the ulcers finally healed in March.

For four years he was extremely sensitive to vitiated atmosphere, smoke, cinders and dust of all kinds, and could not sing or exert the vocal apparatus without feeling distress in consequence.

CASE II.

Mr. W. M. I—— came under treatment in December, 1899, complaining of pain, fatigue and distress after the exertion incident to teaching a large Bible class on Sunday afternoons. This task involved about one hour's steady talking. Of late the distress was so marked as to make it necessary to consult a specialist.

He is 65 years of age, his history negative, except that he is troubled with occasional attacks of gouty eczema marginalis, which always yields to appropriate treatment. He has never been strong physically.

Examination shows slight redness of the left vocal cord, with a brighter line of redness along the free border of the cord running from the anterior commissure to the body of the arytenoid, with a shallow ulcer about the size of an ordinary pinhead just over the tip of the vocal process. There was no marked induration of the surrounding tissues and no glandular swelling.

In consultation with Dr. Lefferts, he made the diagnosis of simple catarrhal ulceration of the vocal cords and advised treatment by fine sprays of strong solution of zinc sulphate. After two weeks' treatment, with improvement, the patient was seized with an attack of influenza which greatly taxed his strength, confining him to bed for six weeks, during which the larynx ulceration healed over without further treatment. In April the larynx showed complete healing.

LX.

TREATMENT OF PRINCIPAL DEFECTS OF SPEECH.

JAMES MOREAU BROWN, M. D.,

CHICAGO.

It is not my purpose at this time to treat extensively of the defects of speech, but simply to give a clear differentiation and the most rational treatment of the more frequent conditions—stammering and stuttering.

Some authors regard stammering and stuttering as implying the same thing Others strongly insist upon the necessity of distinguishing one from the other as implying two different conditions. McCormac, perhaps the earliest writer upon these conditions, defines stammering as hesitation of speech and stuttering as stoppage of speech, the proximate cause being, in most cases, an effort to utter words or other vocal sound when the air in the lungs is exhausted and they are in a state of collapse or nearly so.

Behnke, a later writer, defines stammering as a defect in the utterance of consonants and stuttering as a defect in utterance of vowels. To illustrate this he states that if the stammerer wishes to say "pa" he has a kind of lockjaw and cannot get his consonant out; this, however, once accomplished he has no trouble in adding the vowel to the consonant. He may be equally confused in trying to utter a word commencing with a vowel and in spite of a widely opened mouth no sound will be forthcoming. If a stutterer wants to say "pa" the case is exactly reversed; he has no difficulty in articulating the consonant "p"—his difficulty consisting in adding the vowel to it.

It is a general notion that a child will outgrow the impediments of speech, and in some instances the difficulty does decrease as the mature age is reached. The child learns speech by imitation and many defects of speech may be obviated by early training. Talking to children in the so-called "baby-talk" should in all instances be discouraged.

The treatment of stammering and stuttering is by no means easy. A system has to be employed where, perhaps, the entire mode of life must be changed to say nothing of the continuous training which is to be carefully taken, slight mistakes often causing a complete setback. The treatments, for the sake of convenience, may be divided under three headings:

Pathologic Aspect.—It is the opinion of many that stammering and stuttering may be successfully treated by the training of breath and speech alone. This is, however, erroneous as in the majority or cases it is first necessary to remedy any defects of the upper air passages, and frequently we find conditions due to a great extent to nervous affections. The speech difficulty may be a mere symptom of some grave nervous disorders which should have careful attention.

Mental Aspect.—It is a well-known fact that people afflicted with defects of speech, when in the presence of intimate friends and surroundings, such as to make them feel at ease, have complete control over the powers of speech, which shows that the underlying cause is mental and not physical. An excellent and amusing illustration of this is given by Kussman of Strassburg.

A woman was subject to sudden attacks of speechlessness, which occurred at intervals and lasted some time; during these attacks she was unable to articulate. Many forms of treatment had been resorted to without success. Finally, she was directed to mutter under her breath, at the commencement of every attack, the following words: "In the name of God, the Father, the Son and Holy Ghost," then turn around and expectorate, repeating at the same time, inaudibly, "that is for thee," while thinking of the devil. This remedy invariably stopped the attack.

Other mental causes of stammering, together with timidity and shyness, are distrust, fear of ridicule, eagerness, impatience, excitement, envy and imitation.

Elocutionary Aspect.—This is, perhaps, the most important, and the subject of correct breathing and training is to be considered under this head. In a majority of cases the speech difficulty can be traced fundamentally to the management of the breath, and the results obtained by training a patient to manage his voice by means of diaphragmatic action are marvellous.

As an illustration of this, a patient presents himself stammering very badly; when trying to say the alphabet he can scarcely pronounce a single letter, and in endeavoring to reply to questions the whole body is thrown into contortions. Control of the diaphragm is obtained and a short inspiration taken before each letter by contracting the diaphragm and pronouncing the letter by relaxation. These movements can be controlled by placing the hand upon the abdomen and it is wonderful to observe the results obtained.

The question naturally arises why diaphragmatic breathing should have such a beneficial influence on the voice. In reply to this we may state that clavicular breathing is unyielding and clumsy, owing to the bony structure of the upper part of the thorax and over which it is impossible to get easy and delicate control. The diaphragm, on the other hand, exercises muscular force on that portion of the chest walls which is surrounded only by soft and yielding parts and which can be trained to act with certainty and precision, the diaphragm being the great muscle of inspiration and expiration.

Conversation for a time should be avoided as much as possible and during respiration slowness and equability should be adhered to. The lips and tongue should be placed in position and air expired with force, pronouncing one letter at a time, then two, and later sentences as the training develops itself.

It is a common fault with stammerers and stutterers to try to speak with either widely extended lungs, or empty lungs, either of which is fatal to easy and smooth delivery, and to obviate this habit it is necessary to train the patient to breathe more lightly and more frequently. Breathing exercises not only give a more upright carriage to the body, but tend to develop the chest and keep the blood in active circulation. While they may not themselves effect a cure for stammering and stuttering they nevertheless are the most important aids in the work. Phonation drill of the pharynx depends upon the action of the adductors, or closing muscles of the vocal cords. If these did not act no phonation of tone would be possible, and if they act with uncertainty it naturally follows that the voice will be produced with uncertainty. Control over the soft palate also confers the in-

valuable power of breathing through the nostrils while speaking and singing, thereby preventing dryness of throat of which so many complain.

The time necessary for the treatment of stammering and stuttering will vary. Long-contined discipline of self-control is necessary—more so in children than in adults, who are able to comprehend the importance of and continue the treatment alone.

The above described methods of treatment are based upon observations published by Henry McCormac in 1828 and personal observation in the speech defect clinic of Dr. G. Hudson Makuen of Philadelphia.

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LXI.

REMOVAL OF METALLIC FOREIGN BODIES IN THE ESOPHAGUS BY THE AID OF X-RAYS.

S. E. ALLEN, M. D.

CINCINNATI, OHIO.

Anyone who has tried by means of forceps, coin-catchers, or other devices to remove the various metallic trinkets, such as cents, toy whistles, jack stones, etc., which children are so apt to put into their mouths, and which sometimes find their way and lodge in the esophagus, knows what a difficult task it is. It is impossible to feel the foreign body with the instrument with any certainty, and the whole effort at removal becomes the veriest plunging around in the dark. In fact our efforts resemble very much those of the old-time general practitioner in his attempts at the removal of foreign bodies in the auditory canal, possibly with as painful results.

Then, the diagnosis of the condition is always doubtful, and if nothing is removed one is always at a loss as to whether the foreign body remaines lodged or has been pushed on. Since I have had access to a good x-ray apparatus these foreign bodies present a surgical problem of the simplest sort.

The following short histories of three cases will serve to show the difficulty and danger of attempting removal in the old way and the simplicity and success of the new:

CASE I. Child two years old, brought to me with the statement of mother that it had been playing with pebbles and had swallowed one. This had occurred six days before, and since that time the child had been unable to take solid food, although milk was swallowed, but with much difficulty. X-ray examination showed the presence of what looked like a four-cornered jack-stone, lying in the neck, just below the larynx. The child was sent to the hospital, and under chloroform efforts were made to remove

the same. While the obstruction could be made out on passing a small esophageal bougie, with neither forceps, hooks, nor other instruments could the jack-stone be caught. The efforts at removal only served to wedge it in more tightly, recalling very forcibly those blundering attempts at extraction of foreign bodies in the auditory canal. The case was referred to the surgeon and an external opening made into the esophagus and the jack removed. The subsequent healing was slow and, when complete, an esophageal stricture developed which it was impossible to overcome and the child died a month or so after the operation.

CASE II. Child 4 years old: history of having swallowed a cent four days previously, and since then was unable to take solid food. X-ray examination revealed the cent lying across the neck below the larynx. The child was kept in position before the tube and an assistant looking through the fluoroscope retained the coin in view, while I passed into the esophagus an ordinary laryngeal forceps, one with the blades opening in the plane of the forceps. It was of course easily seen by the assistant, who directed the course of the instrument. "You are down too far;" "draw up a little;" "a little further back;" "now up a little;" "a little further back;" "now open forceps;" "there go right down;" "now you have it." The instrument was then withdrawn with the cent. All done in a few moments, with no laceration and very little struggling of the child.

CASE III. Boy 5 years old, with a history of having swallowed a round, flat, tin whistle six days before, and since then inability to swallow anything but a little water. X-ray examination disclosed the object in the same position as the cent in case II. The child was kept in position, and an assistant taking the fluoroscope, the same forceps was placed in the esophagus and under similar directions the whistle was grasped and removed. This case was not in the office 10 minutes.

These cases have taught me that foreign bodies swallowed by children lodge just below the larynx, where the esophagus narrows as it descends to the stomach. While these bodies cannot be seen by examination with the mirror nor felt with the finger, a laryngeal forceps is plenty

long enough to grasp them, in fact the great tendency is to go too far down. Under the X-ray these objects appear to be just above the notch of the sternum, and one feels a long forceps to be necessary to get hold of them, but this is not the case. They are just out of reach of the finger and within easy reach of such a forceps. In these two cases it was impossible for me to feel the foreign body and I had to rely entirely on the statement of the man behind the fluoroscope. Owing to the position of these narrow circular bodies it was necessary to view the neck from the side so that the assistant could direct antero-posteriorly as well as up and down, and be at the same time out of the way of the operator. These two children held very well and the operation should present no difficulty on account of the struggling tendency of children. The forceps must be introduced gently and nothing fastened or pulled upon until the assistant sees the forceps close over the foreign body and there will be little or no pain produced, and no lacerating or other damage done. The diagnosis and removal of these bodies is so very easy and satisfactory that I rather long for more cases of a similar character.

LXII.

A CASE OF EXOPHTHALMOS FOLLOWING MASTOIDITIS.

By Secord H. Large, M. D.,

CLEVELAND, OHIO.

So much has been written lately about mastoiditis and its complications that I feel a little backward in citing a case that came under my care a few weeks ago.

Mr. C., age 35, was referred to me, suffering from nasal polypi. Both nostrils were completely blocked, and he said he had not breathed through his nostrils in three years. I removed, in all, forty in six sittings.

As a routine practice, I examined his ears and found the canals filled with cerumen. This was washed out, first using hydrogen peroxid, then hot water, and some cotton inserted. He was told to keep a little cotton in his ears for a couple of days.

Next day he came to the office and forgot to insert the cotton and, as it was a very cold and windy day, he developed a very severe attack of otitis media. He was put to bed and given the regular treatment—calomel, one dose of opium and hot douches.

After twelve hours the pain still continued and, there being a very slight bulging, a very free paracentesis, under careful asepsis, was done. Quite a quantity of serum escaped; and a few hours later the pain had disappeared. Solution of boric acid was then instilled in the canal. Twelve hours after the paracentesis the discharge became purulent and on the third day he developed pain over the mastoid.

An ice-bag was applied, and in twelve hours the pain had entirely disappeared; not even on deep pressure was there any tenderness. The discharge was free, but was odorless. It was examined and found to be a streptococcal infection; a blood count was made and showed a leucocytosis of 14000.

The only unfavorable symptom was the temperature, which would run up to 102 and then recede. The pulse never went any higher than 96.

On the evening of the fifth day he was removed to Lakeside Hospital, so as to have him watched more closely.

The family were all opposed to any operative procedure.

Dr. Lincoln saw him with me on the sixth day and, as there was still no pain over the mastoid, no bulging of superior posterior quadrant, and as the temperature had dropped to 99.5, we decided he was on the mend. For the next few days he had no pain, the discharge was lessening, temperature never going any higher than 99.5 and, in fact he was feeling comfortable and wanted to leave the hospital.

On the twelfth night he became delirious, temperature went up to 104 and pulse to 96, and exophthalmos with diplopia developed in the left eye.

Drs. Allen and Lincoln saw him with me, and we decided to operate at once. We were not certain as to the cause of the exophthalmos—whether it was in the sphenoidal sinus, or temporo-sphenoid lobe, or between the meninges—but we made all preparations to make a thorough exploration.

With the assistance of Drs. Allen and Lincoln, I did a very extensive mastoid operation, and when the antrum was opened it was filled with offensive pus. All necrosed bone was removed and a free communication made with the middle ear, and search was made for any fistulous opening to the brain, but none could be found.

The next day after the operation the discharge had diminished considerably, the exopthalmos had entirely disappeared and temperature dropped to 99.5; pulse, 80.

The temperature and pulse, during the entire convalescence, never went any higher than the above. Two weeks later he was discharged, his hearing being normal, no discharge from middle ear, and the opening over the mastoid nearly closed.

Dr. Upson, of Conneaut, his family physician, then took charge of him, and to-day he is entirely well.

There are many interesting points about this case,

the most important being the absence of pain over the mastoid.

Nearly all aural surgeons believe in placing an ice-bag over the mastoid for twelve to twenty-four hours and, if the pain is not relieved, to operate. In this case the pain disappeared entirely after the ice-bag had been on twelve hours.

Another important point was the exophthalmos, certainly caused by sympathetic pressure or absorption of toxins.

From the above case it would seem that there are no ironclad rules by which we are to be governed as to the time we should open the antrum. I myself think that the operation is not done soon enough, nor often enough. The operation is not dangerous, and the results are so gratifying that I think we are justified in making more exploratory openings into the antrum.

New England Building.

LXII.

REPORT OF A CASE OF ETHMOIDAL, FRONTAL SINUS AND ANTRAL EMPYEMA, WITH OPERATION ON ANTRUM AND MIDDLE TURBINATED BODY, FOLLOWED BY DEATH.

By George B. Rice, M. D.,

BOSTON, MASS.

Mr. B., aged 31 years, consulted me July 11, 1902, complaining of pain over the right eye and in the superior maxillary region on the right side, with obstruction to the nose and a discharge from this side, both anteriorly and post-nasally, having an offensive odor. This condition followed an influenza cold, contracted in the February preceding. The general health had become impaired, presumably partly by the trouble in the nose and partly by overwork. Two months previous to his consulting me a local physician had lanced the right side of the superior alveolar process, without finding pus or relieving pain.

Examination of the nose showed a much enlarged middle turbinated body undergoing polypoid degeneration. Percussion demonstrated pain in the supraorbital region extending into the nasal, lachrymal, and malar bones. Transillumination showed darkening of the right antrum, and pus could be seen exuding from beneath and above the middle turbinated body, both posteriorly and anteriorly. A trocar was pushed into the antrum through the outer wall of the nose, beneath the inferior turbinated body, and by suction a little pus withdrawn. It was however impossible to force any through the normal opening, because of the swelling and polypoid tissue about the middle turbinated body. A diagnosis was made of frontal, ethmoidal, and antral empyema, and it was thought wise first to free the normal opening of the antrum by removal of enough tissue from the middle turbinated body to permit of thorough irrigation of the cavity; to establish drainage of the antrum

through the aveolar process; and after a reasonable time to curette the ethmoidal cells and open the frontal sinus externally. This plan was submitted to the patient and the patient's family physician for consideration. Two weeks later he came to my office for a second time and under cocain and eucain anesthesia, the anterior portion of the middle turbinated body and a quantity of polypoid tissue were removed by scissors and cold wire snare. Through the cavity of an extracted tooth the antrum was punctured and irrigated. Pus now came freely through the nose in large quantities, having so foul an odor that it was necessary to open the windows of the room. The antral cavity and the nose were thoroughly irrigated with a warm sterile, Dobell's solution, until the fluid returned clear from the nose and antrum, then a soft rubber drainage tube was put into the alveolar opening and the nose loosely packed with sterile gauze. The patient returned to his home in an adjoining town, and passed a fairly comfortable night. The following day he was seen by my assistant, Dr. E. R. Johnson, at his house. He then complained of pain in the right side of his face, and it was found that he had a temperature of 102, but on the whole he felt fairly well. The gauze from the nose was removed, the nose and antrum was irrigated as before, and a remedy was given for the headache.

On the 28th, Dr. Johnson saw him again. He still had a temperature of 102. Pulse 86. As the pain on the right side of the face continued, he was given an opiate in small, repeated doses, sufficient to relieve the pain.

On the 29th, Dr. Johnson found the temperature unchanged, and the pain apparently better, but he was inclined to drowsiness; the pupils, however, were equally dilated and responded quickly to light. The parts were cleansed as before, without apparent discomfort.

July 29th, I visited the patient with Dr. Johnson and found him with a pulse of 86, temperature 102-2/5. He was drowsy but could be aroused by using some effort. There was now an apparent loss of the use of the left arm, and he had occasional convulsive movements of all of the facial muscles. The face was flushed somewhat, and the family physician who had been in attendance, reported a small amount of albumen in the urine; he was

taking his nourishment well; pulse and strength good. On the night of July 29th, the nurse reported a temperature of 104-4/5, but in the morning it had subsided to 102, with a good pulse of 84. The convulsive movement and coma continued. A neurologist was now consulted to learn, if possible, if the location of the brain pressure, or sepsis, could be determined, with a view to trephining, but as no definite conclusion could be reached, an operation was not attempted. No further symptoms developed, and the patient died on the morning of the first of August, six days after the operation. An autopsy was earnestly requested, but refused.

In thinking the case over, I am inclined to the belief that the patient died from sepsis, not directly from the antral empyema or the operation, but because there existed a frontal empyema and possibly sphenoidal empyema, which cavities were temporarily closed by the inflammation following the removal of the middle turbinated, and that a rupture of one of these cavities took place into the brain tissue. I am inclined to think that it would have been wise to have trephined the frontal sinus on the second day following the operation, although, of course, I could not be and am not now, positive that this cavity was the source of the brain infection. There was no external swelling, no pushing outward of the eye from pressure in the orbit, and no definite symptoms which could localize the infected point.

If any of the readers of the ANNALS has met with a similar case, I would esteem it a great favor if I could see a report of it.

LXIII.

MUCIN AND MALIGNANCY; FACTS AND THEORIES.

By Wm. Stuart-Low, F. R. C. S., England.

LONDON.

No substance in the human economy has been more despised and neglected of medical men than mucin, but it may yet be destined to become the head of the corner.

Mucus has ever been the butt and bete noire of the physician, whose every effort has always been strenuously put forth to brush, wash and dissolve it away as an evil thing, serving only to harbor organisms and retard and jeopardize recovery from pathologic conditions. How far wrong this depreciatory estimate of the value of mucin is, an attentive study of its nature, functions and probable ulterior destiny will amply bear out.

Mucin is the substance that gives the sliminess to mucus. It is very largely present in the system and is found under two conditions—first, almost universally distributed as the cementing material between cells—tissue mucin. This separates connective tissue cells and endothelial and epithelial cells even where most closely approximated. Normally there is always a layer, however thin, of muciginous material which separates the constituent cells in every tissue and membrane throughout the body; and, secondly, mucin is found on all mucous membranes, in mucous glands and in many epithelial and all special goblet cells—conspicuously so in the surface cells of the stomach wall, where every cell is mucus-secreting.

There are probably several mucins in the body. They are of a colloid nature, viscous, soluble in alkalies, but precipitable from such solutions by acetic acid. On boiling with dilute mineral acids they yield a substance which reduces Fehling's solution, and by appropriate processes mucin is broken up into a carbohydrate, called animal

gum, and a nucleo-proteid. Mucin has been specially investigated in the jelly-like connective tissue of the vitreous humor, the Whartonian jelly and in tendons.

While the part that mucin plays is doubtless largely mechanical in lubricating and protecting mucous surfaces, its peculiar chemical constitution and behavior lend support to the belief that it has some further function.

Physiologists mostly agree that mucin is not broken up in the digestive process, but that it passes by the bowel unchanged. The very large amount secreted, however, and the comparatively small amount excreted would indicate that much is destroyed or absorbed in the small intestine, and the great additional supply in the large bowel supports this supposition; and further, nucleo-proteid, with its valuable percentage of phosphorus, being a result of mucin disintegration, the likelihood is that this is not thrown away, but is absorbed from the intestine for ulterior use in the economy.

Where mucin is found fulfilling chiefly a lubricating function, as in the gall-bladder and bile ducts, in the pancreatic duct and the lower bowel, it has a distinctly alkaline reaction and is mixed with the contents passing over the mucous surface. On surfaces bathed by the acid fluid, on the other hand, the mucin is diminished in alkalinity, and in this manner it is maintained on the surface proper for protective purposes; this is well seen in the case of the urinary passages, where much mucus is present and necessary. Such is a wise provision, for should the urine become alkaline the mucus present in it becomes then a serious factor in treatment. In the stomach again the acid gastric juice maintains the mucus on the surface, the protective function being paramount.

On the mucous membrane of the nose and other air passages the mucus plays a most invaluable part. It maintains moisture and conserves warmth, thus facilitating warmth, both common and special. It also keeps the membrane fit to catch foreign bodies (dust, bacteria, etc.) as the air filters through, and serves to secure such until the leucocytes can annihilate or remove them.

One of the most important actions of mucin, and one which has hitherto been altogether overlooked, is as a bactericide. This germicidal power was proved in researches

which I had carried out two years ago in the Laboratory of Clinical Pathology, Queen Anne St. W., by Dr. G. L. Eastes. It was shown that mucin has a retarding influence on bacterial growth, that sterilized solutions containing mucin remained sterile for a long time on exposure to the air, and that bacteria ceased to grow in culture media when mixed with mucin. This is very interesting and instructive, and proves that Nature has, in the secretion poured out on mucous membranes, provided a ready means of suppressing bacterial growth. In the British Medical Journal of March 8th, last, there is an account (quoted from the Lyon Medicale) of a research by Prof. Fernand Arloing, in which this work is repeated. From this he concludes that the mucus of redsnails has a bactericidal action on the bacillus of Loeffler and other bacteria; and nasal mucus was found to be a bactericide for staphylococcus and pneumococcus, but not for coli bacteria nor for Eberth's microbes. It must be evident, therefore, that mucin fulfills a potent part in the defence of the body against bacterial attack.

The essential lesion of carcinoma is the penetration of cells into the surrounding tissues, but whether this new departure on the part of the cells is a result of a cellular change or of some alteration in the intercellular resisting substance is not yet clear. The probability is that there is a certain degree of both. In old age the inter-cellular material undergoes a wasting change, and as a result of this its resistive power against the ingrowth of epithelial cells is lessened, and thus the onset of carcinoma is favored, particularly as the overlying epithelium remains much longer active, and thus there is an influence inducing the cells to penetrate inward among the tissues. The centrosome in cells on epithelial mucous surfaces occupies that part of the cell nearest the surface, and therefore the part most exposed to injury and irritation. The centrosome is the dynamic center, and plays the leading part in the division of the nucleus, the proliferation of the cell, and the regulation of movement.

A study of the distribution of mucus manufacturing structures reveals the striking fact that where mucus is least abundant, there malignant disease is most located. This is the case where skin and mucous membranes meet

at the edges of orifices, as at the lips, prepuce and anus; in the pharynx below the middle, as there are many fewer mucous glands in this situation than in the upper part; on the tonsil, where there are but few mucous glands or cells, even in the crypts. Malignant disease is common in the upper third of the esophagus where there are few mucous structures, and very common in the middle third, where there are practically none; it is least seen of any part in the lower third, where mucous glands are numerous. The esophagus is peculiar in being dependent almost entirely for its lubrication and protective coating on mucus passing down from above—from the nose and vault of the pharynx. I have observed a number of cases of malignant disease of the esophagus and in these there has been much diminution of mucous secretion from above shown by the deficient action of the mucous membranes of the nose and pharynx; and always, too, chronic dyspepsia, due to the same cause—too little mucous protective coating in the stomach. Malignant disease is most frequently situated in the stomach at the pyloric end, but although there is much mucus secretion here, there are special reasons for this selection; it is the most dependent part and most subjected to injury by lumpy and improperly masticated food, and constant irritation by the acid gastric juice; and from the fact that these patients are usually the subjects of deficient mucus supply from above—chronic hypomyxia nasopharyngia and hypomyxia gastrica—which account for the diminished mucous penetrative coating of the stomach.

Cancer is most seldom met with of any situation throughout the whole extent of mucous membranes, in the small intestine and in the lungs. As I have pointed out in previous writings (Mucin in Desiccation, Irritation and Ulceration of Mucous Membranes "Lancet," Oct. 12th, '91) there is more mucus poured into the small intestine than is to be found anywhere throughout the system; and the lungs have an abundant supply in the secretions of the lining membrane of trachea and bronchi. The inspired air is specially cleansed during its passage through the middle of the nose, the pharynx and larynx, so that if malignant disease is set up by irritants from without, there is small chance of such gaining access in any force into

the lungs. The urinary tract again is wonderfully exempt from cancer, and mucus is plentiful on the surface lining. It is pathologically proverbial that malignant disease attacks and spreads in the mamma, but in this gland there is no mucus whatever, not even in the ducts. No protection is here necessary from irritating secretions, unless the milk were to become acid from the formation of lactic acid, and lubrication is not needed, as fat is the dominant element in milk. In the salivary glands how rarely is cancer encountered, but mucin is largely present in them and an element of their secretion—notably so in the submaxillary and sublingual. When malignant disease is met with in salivary glands, the parotid with its very meagre amount of mucus is much the most frequently attacked. The exemption of tendon and cartilage, and the frequency with which bone is affected, are also noteworthy. The mucous glands of the uterus are mostly found in the upper two-thirds of the organ, which is the least frequently affected by cancer, but I look upon a uterus prepared for carcinoma as an atrophic one, or becoming atrophic, just as atrophic rhinitis commonly follows on hypertrophic. The circumstances of frequent pregnancies is a strong predisposing cause. This is the hypertrophic stage in the case of the uterus, and it is at the menopause when the atrophy sets in that malignant disease comes on, as then there is a hypomyxatous condition set up.

During the last few months I have carefully observed fifteen cases of malignant disease, and have been struck by the fact that all have shown evidences of hypomyxia in varying degree. I am indebted to a scholary article by Dr. Walker Overend in the "Lancet" of March 30th, 1901, where he was kind enough to mention my former paper on mucin, for the nomenclature which here I have adopted. The term "orthomyxia" is used to express a perfectly sound and healthy state of the mucous membranes and their secretions. Quantitative change may be termed "metamyxia"—where the change is in excess the term "hypermyxia" is used, the converse condition would be "hypomyxia." Where there is a profound qualitative alteration then "paramyxia" would be most expressive.

Dr. Walker Overend also uses the term myxasthenia comparable to anemia and to neurasthenia, and I think

quite rightly, because when the local hypomyxatous conditions have continued long enough, the state of myxasthenia is brought about.

In hypomyxia naso-pharyngia there is a history of the patient seldom or never using a handkerchief, never having occasion to blow anything from the nose, and there has in all seasons been a marked freedom from colds in the head. I have had cases where there has been irritation felt in the nose and frequent blowing induced, and still with hypomyxia present, but these have been instances of spur or deflection of the septum or other such condition. I have usually tested the hypomyxatous by requesting a trial blow of the nose into a clean cloth, nothing being expelled or at most a little watery fluid, but never the healthy mucus that can usually be readily extruded by the orthomyxatous, even when they happen to be octogenarians.

An inspection of the interior of the nose in such hypomyxatous patients shows a general loss of turgescence and vascularity of the mucous lining; it may even be distinctly dry and crusts may be detected. The turbinals are small and sometimes shrivelled, especially the inferior one, and this is most noticeable on both turbinals posteriorly, where most of the mucous secretion takes place. The cavity is more or less roomy. The fauces and pharynx display similar symptoms of lessened mucous discharge. Occasionally the posterior wall of the pharynx shows the paramyxatous change in form of streaks and tracks of altered mucus. This state of the naso-pharynx is often accompanied by a similar condition of the gullet and stomach, hypomyxia gastrica, with its attendant symptoms of dyspepsia and flatulency, and sometimes constipation; the constipation being due to a like alteration in the large bowel, hypomyxia colica, but this varies greatly in degree.

Now every one of the cases of malignant disease that I refer to and made note of were hypomyxatous to a varying extent; and as most of these were instances of the mucous membrane of the alimentary or upper respiratory track being affected, I am inclined to believe that there is a connection between the two states, and that the hypomyxatous is a fore-runner of the cancérous, especially in view of the fact that three-fourths of all cancer in man occurs in the alimentary canal.

Two features more I made out common to nearly all the fifteen cases of cancer—the first that they were nearly all much addicted to tobacco smoking, consuming from one to two ounces a day; and secondly were large salt eaters. Two of them were so addicted to salt eating that they even had it sprinkled on salt bacon. Both of these habits tend directly to bring about the hypomyxatous state. The hot tobacco smoke for a time stimulates the mucous glands, but soon causes desiccation and atrophy; and excess of common salt is pernicious because it precipitates and coagulates the mucin and causes an impairment of secretion.

The essential factor in cancer being intrinsic, a weakening of the intercellular resistance, so that the cells when proliferating can also penetrate into the intercellular spaces and substance, it may be that a myxastheniatous condition of the tissues favors if it does not cause their loss of resistance. Normally, as before remarked, there is always, even when reduced to a minimum, a layer of muciginous material between cells everywhere in the body, and it is possible that this is maintained in its natural tonic resisting state by an internal circulation of muciginous matter from the intestine to the tissues. If this be so a prolonged diminution of mucin in the alimentary tract would account for a deteriorative change upsetting the equilibrium between the cells and intercellular tissues.

With tissues thus prepared the effect of an injury or chronic irritation might be to determine such a morbid process as carcinoma or sarcoma, whereas in the healthy (orthomyxatous) these would induce no such changes, however long continued, but might only cause a harmless inflammatory action. This theory might also be made use of to explain why carcinoma is an affection of the decline of life, hypomyxia being a senile change.

I have lately been examining a number of very old people, mostly old men. I have found them all wonderfully orthomyxatous, having healthy naso-pharyngeal mucous membranes, good digestion, and regular bowel action. I am inclined to believe therefore that such is an insurance of healthy old age. I certainly have not yet seen one healthy old man who was not orthomyxatous, so that one is warranted in reckoning this as a condition favoring longevity. I recently examined a man aged 96 years who

was sent from a workhouse to the Central Throat and Ear Hospital for slight deafness and tinnitus. He expressed himself as perfectly well in every way. His mucous membranes were in good condition and all to be made out was indrawing of the tympanum of both ears. I had no doubt that this was due to a senile change in the middle ear from desiccation of the mucous membrane, thus also accounting for the tinnitus. This was shown to be the case by the success of the treatment, viz, injection of warm mucin solution up the Eustachian tubes with markedly successful result, as his hearing improved at once, and the tinnitus abated and after a few injections disappeared. This man was a non-smoker and took very little common salt.

Hypomyxia is hereditary. The tendency, to a varying extent, of impairment of the mucus forming function is occasionally very evident in early life, and when so is almost always hereditary, either from one parent or both. This is most noticeable at special hospitals as rhinitis, pharyngitis sicca and atrophica, as early as from 5 to 7 years of age.

I have notes of two cases of sarcoma in the bones of children who were both quite hypomyxatous, as were both their parents before them. The question arises, does this explain the strange and unaccountable occurrence of sarcoma in early life, and of congenital sarcoma, hitherto a baffling problem?

In the following table of cases of cancer it will also be noted that in nearly every instance there was a history of syphilis. It is very remarkable how the stress of secondary syphilis mostly falls upon the mucous membrane. It is notable how many hypomyxatous patients have had syphilis. May this throw any light on the obscure but admited connection between syphilis and cancer?

Cancer has been shown to be much more frequent among civilized than among savage peoples, among the denizens of town than in rural population, and in fact, to dog the footsteps of civilization. This may be explained by the fact that much that is incident to town life is favorable to the development of hypomyxia. Foul and often dusty air and bad ventilation, especially in sleeping rooms, are some of the most noxious influences. Although cancer has been

found to be commoner among town dwellers, any one with a hereditary hypomyxatous tendency, if in unfavorable surroundings, will readily become hypomyxatous no matter how rurally remote he may reside. The Boers might be cited as a people well known to be very liable to cancer, whose domestic sanitation is far from perfect, but is most emphatically bad as regards the ventilation of their sleeping apartments. The immunity of the lower animals from cancerous processes is still unaccounted for. Wild animals are very seldom affected and our domesticated animals but rarely. It is proved that the domesticated animals most subject to cancer are not as one might expect, the dirty feeding pig, but those cleanly and affectionate friends and companions of man, the cat and dog. They often share with man the same unhealthy surroundings, and this doubtless to some extent explains their liability. Another fact also helps to elucidate this obscure point, for the dog and cat possess much less provision for the formation of mucus than the horse, ox, sheep or pig. Their turbinated nasal structures are excessively convoluted to enhance the sense of smell, and so mucous secretion is a subordinate factor, little or no mucin being ever formed in an olfactory region unless in very small amounts. The feces of the dog indicate but sparse mucus supply all along the alimentary canal. The horse, ox, sheep and pig have quite an extraordinary development of mucin forming organs.

In the horse not only are both the anterior and posterior turbinated bones very well developed, but each bone has a special fibrocartilaginous framework extending to the external orifice of the nose.

These turbinated bones are essentially so disposed as to furnish the mucous membrane of the nose with a vast surface for mucus secretion, and the flexible appendages are even sometimes double. This free surface presents numerous glandular orifices and is constantly covered by an abundance of mucus that prevents desication. The upper one-third only of this larger area is devoted to olfaction.

Racemose mucous glands are specially numerous on the area of the septum and the cartilaginous appendages. Besides this extensive secretory region, solipeds have an-

other special arrangement which also subserves mucus secretion; this consists of the socalled gutteral pouches—one on each side of the pharynx. They have, each, a length of four inches and a capacity of three-fourths of a pint. Their mucous lining is thick and vascular and very thickly studded with racemose mucous glands. Much mucus is secreted in these pouches and poured into the pharynx. Few mucous glands are present in the horse's esophagus, but it is well lubricated and protected by the copious supply from above, as all this mucus is swallowed, for the horse never has any discharge from the nose in health. Jacobson's organ is five inches long in the horse and very thickly packed with mucous glands. The ox has, also, a vast development of the turbinated bones, especially the posterior one and, besides, there is an extra turbinal—the third turbinated bone of the ox. The sinuses of the head, particularly the frontal sinuses, which are very extensively developed, open freely into the meatus and afford additional mucous secreting surface. In the pig there is also a large mucous secretion area and the turbinated bones are very prolonged.

The ox is constantly licking its muffle and thus swallowing the mucus escaping from the nose and removing the humid secretion with which it is always kept damp.

Chauveau, in his comparative analyses of the domesticated animals, gives the following table of the ratio of the area of the cranium to the face:

1 : 2.69 in the Horse.
1 : 3.43 " " Ox.
1 : 3.24 " " Pig.
1 : 1.17 " " Dog.
1 : 0.68 " " Cat.

Order: Cat, Dog, Horse, Pig, Ox.

The face area may fairly be taken as a very good index of the mucous supply area. It will be noted that this area is much the smaller in the *cat* and *dog*. The horse's secreting area is very much supplemented by the secretion in the gutteral pouches.

Name.	Occupation.	Disease.	Age.	Common Salt.	Tobacco.	Syphilis.	Hypoymxia.
Arthur R. Russel. Mans., Oxford St. W.	A "bucker of horses." much indoors and in close rooms.	Malignant of rectum.	56	Taken an excessive amount over 40 years.	Smoked cigars. cigarettes and a pipe to excess.	Yes.	Has suffered from well-marked hypo-myxia. Nasopharyngia. gastrica et colica for 30 years.
Jas. K., Faucitt Rd., Rotherhithe.	Laborer with the Nat. Telephone Co., much in dust at underground work.	Sarcoma of the tonsil.	30	Taken an excessive amt. all his life—a great meat and bacon eater.	An ounce a day for years.	Yes.	Well marked hypo-myxia, naso-pharyngia et gastrica et colica. and a rapid eater.
Mrs. R., Bury St., W.	House-wife, much indoors.	Malignant of the liver.	45	Always takes a good deal of salt.	No.	Yes,	Hypo-myxia naso-pharyngia moderately marked. but gastrica et colica quite evident.
Thos. H., Kentish Town.	Worked many years in a very dusty sugar warehouse.	Sarcoma of the left side of the pharynx with a mass of glands in the neck.	69	Has consumed a very large amt. all his life.	At least one ounce a day for 50 years. often two.	Doubtful but was exposed to infection in his younger days.	Hypo-myxia naso-pharyngia very well marked, and also gastrica colica very evident.
Js. C., Walthamstow.	Cabinet maker, indoors work, and often very dusty.	Malignant of pharynx and parotid region.	51	Has always taken a very large amt.	One ounce a day but often got thro' one lb. a week.	Ye .	Hypo-myxia naso-pharyngia et gastrica et colica very evident.
Mrs. K., Albany Rd., E. C.	Housewife.	Malignant of omentum.	45	Has always taken a good deal of salt and has had a ravenous appetite for shell fish.	No.	Doubtful.	Hypo-myxia naso-pharyngia slightly. but gastrica et colica evident.
Sidney L., Pimlico.	Piano polisher; indoor work and often very dusty.	Malignant of the esophagus.	65	Has always taken a large amt. of salt.	Smokes over one pound a week.	Yes.	Hypo-myxia. naso-pharyngia and gastrica et colica very well marked.

Wm. B., City.	Indoor messenger.	Malignant of the esophagus.	68	Very large consumer of salt all his life.	Smokes very large quantity.	Doubtful.	Hypo-myxia, N. P. well marked, and gastrica et colica.
Edwin B., West Ham.	Carman of the Midland Railway, often in foul dust.	Epithelioma, glosso-epiglottic region.	59	Very large amt. all his life. Put it on salt bacon.	One ounce a day.	Yes	Hypo-myxia N. P. et gastrica et colica very well marked.
Wm. M., Edinbro'.	News-agent (dusty indoors work).	Malignant lympho-sarcoma of cervical glands.		Had always been fond of salt with his food.	Half an ounce a day at least.	Doubtful.	Hypo-myxia naso-pharyngia et gastrica well marked.
Jas. J., Dulwich Rd., S. E.	Hair-dresser, in city, under-ground and dusty.	Epithelioma with enlargement of glands in the neck.	71	Taken salt in large quantities for 50 years.	Over an oz. a day, often more for all his working life.	Yes.	Hypo-myxia naso-pharyngia et gastrica et colica very well marked.
Chas. W., Kentish Town.	Engineer, indoors, worked in iron dust.	Malignant of the esophagus.		Taken salt with all his food in large amt. all his life.	Over one oz. a day.	Yes.	Hypo-myxia in nose and throat and stomach well marked.
Mary B., Pimlico.	Housewife, "always indoors."	Epithelioma of the tongue.	41	Very fond of salt and had taken it in large amt.	No.	No.	Hypo-myxia in nose, throat, stomach and bowels evident.
Js. B., Brixton.	Broker's clerk, underground, dusty office.	Sarcoma of the tonsil.	28	Always taken salt in large amt.	Smoked nearly one oz. a day.	Yes.	Hypo-myxia naso-pharyngia et gastrica.
Wm. P., Walwark.	Dustman, very dusty work.	Carcinoma of the pylorus.	43	Taken an excessive amt. of salt always.	Smoked one oz. a day for years.	Yes.	Hypo-myxia well marked in all the usual situations.

Treatment. The first patient on whom mucin was used in malignant disease was James Castle (5th on the list) residing at Walthamstow, who came to the Central Throat and Ear Hospital with a large mass of glands in parotid and cervical regions and also a hard mass bulging into his pharynx. He was suffering great pain in the throat and up the neck to the head. Mucin in the form of gargle composed of soloid and tabloid mucin co. one of each dissolved in one ounce of hot water with a third of an ounce of lime water gave him great relief and facilitated the swallowing of food. Mucin feeding was ordered and he was told also to swallow the gargle. He thus consumed from 10 to12 tabloids and the same number of soloids per day. His appetite improved and his bowels—always very costive,only having an action about twice a week—soon became regular, and although his case was a perfectly hopeless one from the first he certainly improved for a time and got a great relief from this treatment. The mass in the neck broke down and a large ulcerated surface resulted.

This was dressed with a lotion similar to the gargle, which kept the broken surface beautifully clean and sweet and greatly relieved the pain and diminished the discharges. He lived three months and was able frequently to go out, but the growth spread to the lungs and he died of pneumonia. The alleviation of the pain was certainly most marked, allowing the poor man to sleep, which he had been unable to do formerly.

The 2nd case was that of J. Jacobson (11th on the list) suffering from epithelioma of pharyngeal wall in the lower part and having a mass of glands on the left side of the neck. Mucin was used in a manner similar to that in the last case.

The pain was greatly relieved, and he was able to sleep well and had a good appetite and his swallowing was done easily.

The mass of glands diminished and at the end of one month's treatment there was a difference of two inches in the circumference of his neck. Unfortunately he contracted a severe attack of influenza and died after three days illness.

James Kent (2nd on the list) had been under Dr. Abercrombie's treatment for one month at the Central Throat

and Ear Hospital, suffering from an induration of the right tonsil with a mass of gland in the neck. The case was going from bad to worse and Dr. Abercrombie kindly allowed me to use the mucin treatment. The growth had extended onto the soft palate and had ulcerated. The jaw was fixed so that he could only separate the teeth a very little way and the mouth and breath were very offensive. He was also in great pain. Mucin was used as gargle and a mouth-wash and he was given mucin feeding. The improvement was very marked indeed. The pain ceased and the circumference of the neck diminished by three 3″ in one month (21st of Feb. last). To hasten the process, I injected 1/4 of an ounce of a warm solution of mucin into subcutaneous tissue of the back three times a week and occasionally into the mass of glands in the neck. This treatment was continued for another month with good effect. The ulcerated throat cicatrized over and he could easily chew and swallow solids, so much did the jaw relax. He also gained 7 pounds in his weight. This favorable progress met with a check when two of the subcutaneous injections suppurated in succession. The reason for this I could not explain as the others had all done well, and every aseptic precaution was taken. One singular thing was that although the injections into the mass of glands were conducted in the same way and with the same fluid, yet never at any time was there any suppuration. There seemed to be a profound change in the tissues in the neighborhood of the growth. The growth continued now to increase both inside the throat and in the neck although the mucin still gave him great ease from pain, and not until the 30th of May was it necessary to perform tracheotomy. Gastrostomy was done at the same time in St. Thomas's Hospital to which he was sent on the 28th of May. The mucin treatment undoubtedly checked the growth for a time. This was proved to be sarcomatous by microscopic examination. The man is now home and still under the mucin treatment and again improving, being able to swallow.

Another case is that of Thos. Hopkins who came to this hospital complaining of pains in the throat, and up the side and back of the neck. (Case 2nd on the list.) During the last 3 months he has been having mucin treatment with great relief to his pain and the enlargement has somewhat

lessened. His appetite has improved. He is very hypomyxatous, but mucin sprays and gargle have helped the pharyngeal discomfort, and his gastric symptoms are alleviated and his bowels regular. He is having mucin feeding but no hypodermic injections. Dr. Dundas Grant kindly allowed me to use mucin in this case.

Edwin Beck residing at West Ham (9th on the list) came to the Central Throat and Ear Hospital complaining of dysphagia, severe pain in the throat and sleeplessness. He was found to have an epitheliomatous ulcer in the glosso-epiglottidean region and there was a mass of glands on the left side of the neck. The mucin treatment has given him great relief and enabled him to swallow much better and to sleep at night. He is still under treatment.

The case of Arthur Reader (the first on the list) is one in which I have found mucin afford signal benefit. One month ago I did an inguinal colotomy for malignant disease in the rectum on this gentleman. As he is very hypomyxatous I had great trouble to maintain the bowels in regular action with soft stools, but mucin feeding to the extent of twelve tabloids a day—two before and two after each meal—has solved this difficulty most satisfactory, and also remedied the gastric irritation and flatulency. This is a much better means of regulating the bowels in such case, than giving oily aperients as it supplies the natural lubricant and never causes any griping pains or disturbances.

These cases in which mucin was prescribed were all in advanced stages before commencing its use but yet there was improvement in each instance. In an early stage this improvement is likely to be better maintained, and in hypomyxatous patients who have been operated upon for cancer it might be tried to prevent the recurrence of the disease. Of course, tobacco and salt were peremptorily prohibited.

45m Welbeck St.

LXIV.

THE ENDOTHELIAL PHAGOCYTES OF THE TONSILLAR RING.*

By J. L. Goodale, M. D.,

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In the tonsillar ring two forms of phagocytic cells are encountered: first, polynuclear neutrophilic leucocytes, and second, large mononuclear cells, resembling, morphologically, epithelial cells. Both these forms of cells may be observed to incorporate foreign substances, with this difference, however, that whereas the leucocytes are phagocytic for bacteria, and for a variety of amorphous detritus, the epithelioid cells, on the other hand, are capable of incorporating living cells.

Attention was first called to the fact that certain cells may become phagocytic for other cells, by Mallory[1], in a histologic study of the lesions of typhoid fever in 1898. From his observations he concludes that dilute or weak toxins produce proliferation and phagocytosis in certain cells, particularly in the endothelial cells of lymphoid tissue, and of the lymphatics.

Several years ago, in a histologic study of acute tonsillitis, I found in every case examined a more or less marked proliferation of the endothelial cells lining the reticulum of the follicles, with a formation of endothelial phagocytes. These findings led me to examine subsequently a large amount of material, with the object of ascertaining, first, whether these phenomena occurred also under normal conditions, and second, whether they bore any definite relation to infectious processes.

The following paper embodies the results of these observations.

For the satisfactory demonstration of the endothelial phagocytes and their inclusions, it is found best to place fresh tissue in Zenker's fluid, and to stain with alkaline methylene blue and eosin. Hematoxylin and eosin give much less perfect pictures.

*From the Journal of Medical Research.

Normal Histology.—In the study of the normal histology, tonsils were obtained at autopsy which presented, so far as could be determined macroscopically, no abnormality. Material was also obtained during life from cases requiring operation for adenoid hypertrophy, in which the tonsils exhibited clinically little or no enlargement. Finally a comparative study was made of the tonsils in some of the lower animals.

Man.—In the human subject, the tonsils show, in those places corresponding in situation to the follicles, a characteristic arrangement of the connective tissue cells. With Mallory's triple connective tissue stain, the framework of each follicle is in cross-section seen to be composed of a well-developed ring or capsule, composed of from four to six concentric layers of connective tissue. With ordinary acid stains as eosin, this fibrous envelope is difficult to isolate. It may be well demonstrated by neutral orcein. The follicles present, in sections of the tonsil made of the vertical to its base, a resemblance to a signet ring, with the seal directed toward the lumen of the nearest crypt. This appearance is due to the fact that the interior of the follicle is composed chiefly of endothelial cells, which owing to their large amount of cytoplasm are sharply differentiated from the encircling collection of lymphocytes. These endothelial cells undergo segmentation in a conspicuous manner, and produce large, so-called epithelioid cells. In every case which came under examination one or more of these phagocytic cells were found in the follicles. Where but one or two were present in the follicles, they were usually situated near the centre. As a rule, not more than eight or ten were found in a cross-section of an individual follicle. The incorporated substances consisted almost exclusively of lymphoid cells and cells, and cellular detritus, probably derived from lymphoid cells, and were generally situated in clear spaces or vacuoles. Occasionally red blood corpuscles were found incorporated. Polynuclear leucocytes were not found in the cells, nor did the phagocytes appear to attack the endothelial cells. On the side of the follicle adjacent to the nearest crypt, the lymphocytes are especially numerous and closely packed. In this situation from four to six rows of lymphocytes are

found between each pair of concentric rings, which are thus more or less widely separated from each other. On the side of the follicle which faces toward the fibrous trunk, but one or two rows of lymphocytes are found between each pair of concentric rings. As one passes from the lymphoid cells of the capsule of the follicle, an alteration in these cells is noticed, consisting of a gradual increase in the amount of surrounding cytoplasm, which is usually more marked on one side, and appears to be heaped up more at the periphery than in the centre. The nucleus simultaneously undergoes alterations, consisting in a separation of its chromatin into deeply staining masses, which are situated in a rosette fashion, connected with each other by fine chromatin threads. These cells possess the characters of plasma cells. All stages of transition are observable, between the typical lymphoid cells and typical plasma cells. It was not, however, observed that these plasma cells were incorporated by the endothelial phagocytes. In the mucous membrane of the crypts numbers of plasma cells, lymphoid cells, and polynuclear neutrophiles were observed. In the fibrous trabeculæ near the base of the organ varying numbers of eosinophilic cells were usually encountered, but never in the neighborhood of the follicles or of the crypts.

Lymphoid tissue was also examined from other portions of the tonsillar ring. In the lingual tonsil, the lymph follicles are numerous, and the central reticulum of each follicle is well defined. An occasional endothelial phagocytic cell was found in the majority of specimens examined, but they were less numerous than in the faucial tonsils.

In examination of the pharyngeal tonsil from children, showing what may be called normal conditions, that is, occurring in the form of mammillated projections about one-eighth to one-quarter of an inch in height, it is seen that the central reticulum of the follicle shows but a slight tendency to proliferation, and the endothelial cells are sparingly encountered. In specimens obtained from adults at autopsy, from the vault of the pharynx, there is likewise observable a distinct central reticulum of the follicles, with an occasional endothelial phagocyte.

Comparative Histology.—Sections of tonsils from an opossum, stained with polychrome methylene blue and eosin, show the follicle to be indicated by a small group of cells, possessing a large amount of non-granular protoplasm, with deeply staining nuclei. These cells correspond in appearance to the endothelial cells found in the human tonsil. Scattered among these cells are found considerable numbers of lymphoid cells, arranged in irregular lines together, with cells having the characters of plasma cells. In the germ center of each follicle are seen a few cells, resembling the phagocytes produced by proliferation in human tonsils. They consist of a relatively large amount of acidophilic protoplasm, and with an eccentrically situated, lightly staining nucleus, and contain in their interior cells and cell fragments. The cells consist of lymphoid cells and plasma cells. The nuclei of the included cells appear compact and shrunken and stain deeply.

The follicle resembles closely that found in the human subject, differing chiefly in the smaller size of the germ center, and in the larger number of lymphoid cells found in the latter.

Sections of the follicles stained by Mallory's triple connective tissue stain show the germ center of the follicle to possess a well-developed fibrous reticulum, arranged in the form of irregular channels, containing these lymphoid cells previously referred to.

Examination of the tonsil from an adult cat shows but a slight differentiation of the follicles from the surrounding tissue. The germ centers are relatively large, and contain numerous large phagocytic cells, with a variety of inclusions, situated in the center of the vacuoles. The number of phagocytic cells in a cross section of the follicle ranges from ten to twenty. Red blood corpuscles are found frequently among the inclusions. Scattered among the endothelial cells are numerous lymphoid cells. Between the follicles are large numbers of large monocular phagocytes, crowded with cellular inclusions and detritus. Some of the cells contain fifteen or twenty red blood corpuscles. The eosinophilic polynuclear cells, which occur in large numbers in the lymphoid channels, near the base of the tonsil, are at times incorporated by the phagocytic

cells, but their granules disappear almost before they have been taken into the body of the phagocyte.

Staining by Mallory's method for connective tissue shows the development of the fibrous reticulum to be much less marked than in the case of the opossum, resembling in this respect more closely the human tonsil.

Several specimens of tonsil from yearling sheep were examined. The follicles resemble closely those found in the human tonsil, possessing a distinct endothelial reticulum, with surrounding lymphoid cells. Endothelial proliferation and phagocytes were present in the majority of follicles, particularly near their center. The inclusions were chiefly lymphoid cells and cellular detritus, although at times polynuclear leucocytes appeared to be incorporated. The fibrous tissue is well developed in the follicles.

Several specimens were examined in cattle. The tonsils here exhibit a penetration of mucous glands in all directions in the lymphoid tissue, but the individual follicles exhibit the ordinary type. The fibrous recticulum of the follicles is poorly developed, and proliferation varies in amount in different follicles. In some the mitotic figures are numerous, while in others none are found in cross section. The phagocytes resemble essentially those of the sheep, and contain inclusions of lymphoid cells and cellular detrius.

PATHOLOGIC HISTOLOGY.

Hyperplasia.

Of the pathologic conditions of the tonsils it seems desirable to describe first simple hyperplasia, since there is no line which separates it sharply from the normal tonsil, and especially since many of the pathologically altered tonsils which are shortly to be described were to a greater or less extent hyperplastic.

We have to consider two forms of hyperplasia: first, diffuse hyperplasia, and secondly, the so-called papillary hypertrophy.

In simple hyperplasia the most conspicuous alteration in the tonsil is a great increase in the number of the endo-

thelial cells of the recticulum. There is also an increase to a less extent of the interfollicular endothelial cells. The lymphoid ring is, however, not increased proportionately. It even gives, at times, the appearance of a thinning, as if due to enlargement of the central reticulum. In the recticulum, as shown by saffranin, proliferation of the endothelial cells is extremely marked, and in proportion to the degree of hyperplasia present. The endothelial phagocytes are most numerous near the center of the recticulum, and are crowded with lymphoid cells and cellular detritus to a varying degree. Where in addition to the hyperplasia there is an associated cheesy collection in the tonsillar crypts, the endothelial phagocytes appear to be correspondingly increased in number, thirty or forty having been observed in a cross-section of a single follicle. In such cases the number of polynuclear leucocytes in the crypts is increased, and are found to be incorporating bacteria to a greater or less degree. Staining of the tissues by Gram shows, however, no penetration of the bacteria below the epithelium, and in no cases were bacteria found in the endothelial phagocytes. The lining endothelium of the capillaries and blood vessels showed no unusual proliferation.

Two cases of papillary hypertrophy were examined. In the first case a tonsil enlarged to the size of a pigeon's egg, and irregularly lobulated and mammillated, presented on histologic examination a marked proliferation of mucous and sub-mucous tissue, the former being prolonged upward into delicate papillæ. The endothelial lining of the connective tissue showed active proliferation. Not only is the mucosa in a state of active proliferation, but the submucosa as well, which throws upward long digitations above the surrounding level of the mucous membrane. The follicles are much enlarged, owing to a proliferation of their endothelial reticulum, and phagocytic cells are abundant. The lymphatic ring surrounding each follicle shows no especial widening, and there is no unusual collection of lymphoid or plasma cells in the interfollicular spaces, although the endothelial cells are here in a state of heightened proliferation. The crypts are filled with detritus, leucocytes, and bacteria. Sections stained by Mallory's method for connective tissue show the pa-

pillæ of the mucosa to be largely composed of connective tissue fibers, lined with endothelial cells. There is no abnormal development of connective tissue in the center of the follicles, the stain showing the enlargement of the latter to be due essentially to a heightened proliferation of the endothelial cells. The larger fibrous trunks of the tonsil show a heightened activity of their fibroblasts, and are in direct communication with the digital prolongations previously described.

A case of papillary hypertrophy, previously described by Dr. J. P. Clark, shows on microscopic examination a marked proliferation of the connective tissue of the mucosa as well as of the lining endothelial cells. The epithelial layer shows numerous mitoses, and here and there isolated degeneration of the cells. It sends down interpapillary prolongations which contain very numerous mitotic figures. The mucosa proper is crowded with lymphoid cells, as are also the lymphatic channels in the vicinity, many of which are widely dilated with these cells. The mucous membrane contains many polynuclear neutrophilies, fixed in the interspaces. The submucosa shows a marked development of blood vessels, which are distended with red blood corpuscles, lymphoid cells, and polynuclear neutrophiles.

The condition resembles closely that found in the preceding case, both in the development of the endothelial and connective cells, but does not apparently reach so marked a development. It differs from it most noticeably in the much greater infiltration of the lymph spaces with lymphoid cells.

Retrograde Metamorphosis.

A series of tonsils from adults were examined, with regard to the phenomena exhibited by the endothelial cells of the reticulum. These cases have been reported in detail[2], and only a brief résumé of the points in question will be given here. In atrophied tonsils, the follicles are markedly diminished in number. Those which are situated near the crypts are the largest, and show most active proliferation of the endothelium. Those follicles, on the other hand, more remote from the crypts are

smaller, and show little or no tendency of the endothelial cells to proliferate. The follicles which are near crypts provided with a loose, mesh-like epithelium are more active than those follicles in the vicinity of the crypts lined with a more compact epithellum. In the interior of the tonsil the fibrous changes are usually more marked than near the periphery, and traces may be seen here of follicles, the germ center of which has disappeared, with the exception of a few endothelial cells, surrounded by a small collection of lymphoid cells.

Acute Inflammation.

Inflammatory processes affecting the faucial tonsils were studied under two forms: first, those occurring primarily through infection, and secondly, those produced by trauma.

In acute infectious tonsillitis the endothelial center of the follicle appears enlarged from an increased proliferation in the endothelial cells.

The number of phagocytes in each follicle ranges (in a section 2 micra in thickness) from ten to fifty or more. The inclusions in these cells do not apparently differ from those found in normal and in hyperplastic tonsils, consisting chiefly of lymphoid cells, cell fragments, and fine granular detritus. At times plasma cells appear to be incorporated. It must, however, be remembered that many of the tonsils were originally hyperplastic, and must have presented, therefore, an increased endothelial proliferation, before the onset of the acute inflammation. The appearance, in fact, of the endothelial reticulum of the follicle does not differ materially from that found in many cases of hyperplasia. A marked point of distinction was, however, present in all cases, and consisted in a proliferation of the endothelial cells of the capillaries and small vessels. These endothelial cells exhibited frequently swelling and desquamation. They were at times found lying free in the lumen of the vessels. Another point of distinction observed in these cases was the widening of the ring of lymphoid cells around each follicle. These lymphoid cells occurred also in greater numbers in the lymph channels between the follicles.

In the less frequent cases of suppurative tonsillitis, which are characterized by the presence of multiple abscesses within the follicles, examination shows the following conditions: The first indication of an abscess in a follicle consists in circumscribed infiltration of polynuclear leucocytes among the endothelial cells of the reticulum. The blood vessels in the immediate neighborhood contain large numbers of polynuclear leucocytes, some of which are seen in the act of passing through the vessel wall. The endothelial cells of the vessel show a varying amount of proliferation in swelling. Micrococci are found in varying numbers in the region occupied by the polynuclear leucocytes, lying for the most part free in the intercellular spaces, although they not infrequently may be seen in the interior of the polynuclear leucocytes, and apparently also within the large endothelial phagocytes. With the growth of the abscess the follicle increases in size, as the result both of heightened emigration of polynuclear leucocytes and of the proliferation of the surrounding endothelial cells of the reticulum. The endothelial cells of the reticulum in the immediate neighborhood of the abscess show a swelling of their cytoplasm, and an irregularity in the outline of their nucleus, which appears elongated, indented, or twisted. A marked increase is simultaneously observed in the number of endothelial phagocytes in the vicinity, which contain also a greater number of incorporated lymphoid cells and cell fragments.

Investigations were made on human tonsils to determine the effect upon the proliferation of the endothelial cells of the reticulum. In a series of six cases, a drop of chromic acid was introduced into the crypt of a tonsil, which exhibited sufficient hypertrophy to require excision, and at a varying period of time afterward the tonsil was removed and examined histologically. In all the cases examined, a necrosis of epithelium of the cauterized crypt was observed, extending for varying distance into the underlying lymphoid tissue. In the center of the necrotic area there were no polynuclear leucocytes, but toward the periphery these were encountered in large numbers. Bacteria were numerous throughout the necrosed area, and in the region of infiltration many polynuclear leucocytes

were seen, usually with bacteria in their interior. Below the area of necrosis a number of lymphoid and plasma cells were observed, together with many polynuclear neutrophiles, the latter emigrating from the dilated blood vessels of the vicinity. The endothelial cells of the reticulum showed nuclear degeneration and fragmentation, but no evidence of phagocytosis was observed. The follicles in this vicinity presented traces of their endothelial cells in the form of acidophilic rings corresponding to the preexisting cell walls, filled with amorphous homogeneous material. Below this region, at a greater distance from the site of the cauterization, the follicles show an increased endothelial proliferation of the reticulum and of the intima of the blood vessels with a formation of many phagocytes.

The number of cases observed was too small to justify conclusions regarding the relative intensity of these phenomena in the different stages of the process.

Conclusions.

From these observations it is evident that in the normal tonsils, both of man and of a variety of the lower animals, large mononuclear phagocytes are present, which appear to be derived from a proliferation of the endothelial cells of the reticulum.

In hyperplasia of the tonsils there is a proportionate increase in the proliferat on of the endothelial cells of the reticulum, and formation of phagocytes, without, however, a corresponding increase in the number of lymphoid cells, or in the endothelial cells of the blood vessels.

In atrophy of the tonsils, the endothelial cells of the follicles are seen first to diminish in number, and endothelial phagocytes are correspondingly few, while the lymphoid cells persist relatively longer.

In acute inflammation, the characteristic feature of the process consists of a heightened proliferation of the endothelial cells of the blood vessels, with swelling of their cytoplasm together with an increased number of lymphoid cells. These changes are relatively more marked than the increased endothelial proliferation of the reticulum with follicles. Where circumscribed abscess formation occurs in the follicles, an increased proliferation

of the endothelial cells, both of the reticulum and the capillaries, is observable in the vicinity.

Where an intense irritant acts upon the endothelial cells of the tonsil, degeneration and necrosis result in the immediate vicinity. At a greater distance proliferation appears to be excited in these cells.

It seems, therefore, probable that proliferation of the endothelial cells of the reticulum, with a formation of phagocytes, is not necessarily dependent upon the influence of bacterial toxins for its production, but appears rather to stand in a definite relation to the size or activity of the organs in question. Proliferation, on the other hand, of the endothelial cells of the blood vessels was found to occur only in association with other phenomena of inflammation.

(My thanks are due to Dr. C. S. Minot for facilities kindly afforded me in his laboratory in the Harvard Medical School.)

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SECTIONS OF LARYNGOLOGY AND OTOLOGY.*

BRITISH MEDICAL ASSOCIATION (COMBINED MEETING).

LXV.

THE ETIOLOGY AND DIAGNOSIS OF ETHMOIDAL AND SPHENOIDAL SUPPURATIONS.

By L. Grünwald, M. D.,

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ETIOLOGY.

The etiology of these two diseases corresponds in general with that of other focal suppurations of the nose; they are acute infectious disorders of general or local origin. The principal factor in the production of a chronic disease from an acute inflammation in this situation is impediment to free discharge; thus it is easy to understand at once the most frequent cause of chronic suppuration in these cavities and its comparative rarity. The sinuses in question have their openings situated at their deepest and most dependent parts—that is, under the most favorable conditions for drainage. This, however, will be altered by swelling of the adjacent mucous membrane, and to this the ethmoidal bone especially is much exposed. Such a swelling may be superadded to a previous acute inflammation of the cells themselves, or it may be the consequence of an inflammation in an adjoining cavity. It is certain that sphenoidal and ethmoidal suppurations rarely occur alone; in most cases they are combined with suppuration of other cavities, or they may occur together. Ethmoidal suppuration is found alone more frequently than sphenoidal, and this statement will be only slightly changed by the consideration of the much greater difficuly of making the diagnosis in the latter affection. In my own cases sphenoidal suppuration was combined with ethmoidal dis-

*British Medical Journal, August 30, 1902.

ease on the same side in 73 per cent., but in ethmoidal affections the same combination existed in 40 per cent. only. We may conclude, therefore, that chronic sphenoidal disorders are frequently secondary to those of the ethmoid bone. I have seldom met the combination of sphenoidal and maxillary antrum disease, though other authors have more frequently seen this. The combination of ethmoidal with maxillary suppurations is more common; and though I do not in the least agree with Well's view that all obstinate maxillary suppurations depend upon disease of the ethmoidal bone, I must agree that suppuration of the ethmoid alone is frequently diagnosed when only one or other of its cells may be slightly affected, whilst the more important and fundamental maxillary inflammation is overlooked.

It seems unknown, but I have no doubt that adenoid growths can infect the ethmoidal as well as sphenoidal cavities directly by their secretion, and prevent by the maintenance of swelling the natural cure by drainage of these cavities when once infected.

DIAGNOSTIC SIGNS.

Subjective troubles, some of which may certainly be localized, may call our attention to the affected part. In some cases of sphenoidal inflammation no complaint may be made, but in others, vertigo, pains of occasionally excruciating character on the vertex, deeply in the head behind the eyes or, by false localization, in the region of the ears, or not uncommonly in the occiput, are present. But how uncertain subjective signs in general are, may be gathered from Schäffer's and my own observation of typical supraorbital and infraorbital neuralgia in such cases. These symptoms, unexpected as they may be, are not merely accidental, but are caused by an irritation of the sphenopalatine ganglion, the immediate neighbor of the sphenoidal cavity. A mistake may nevertheless be made by a superficial observer. We too frequently meet not only general practitioners, but also specialists harboring the thoroughly false view that the causes of pains must be found near their localization, hence the general mistake relative to the frequency of frontal suppuration.

Loss of smell frequently accompanies chronic sphenoidal suppurations in consequence of the obstruction to the fissura olfactoria.

Ophthalmic troubles, such as asthenopia, scotoma, painful irritation of the ophthalmic nerves, and deterioration of visual power, as noted by Schäffer, are explicable by the neighborhood of the orbital and the basal nerve. Pain is usually more violent in acute inflammation, but then it is, on account of radiation to more distant regions, still more uncertain as a diagnostic sign. The same holds good with disease of the ethmoid bone, only here the troubles are usually more severe than in any other cavity, and here more especially disagreeable complication of constant pain, mental depression, and intolerance to nervous excitement may be found. Asthenopia is also frequent, and the pain will often be referred to the region of the eyes. Supraorbital neuralgia may occur here as well as in frontal empyema, combined with tenderness on pressure. Special to ethmoidal disease is the pain produced on pressing the lachrymal bone, a fact which is explained by the vicinity of the lamina papyracea.

OBJECTIVE SIGNS.

I agree with Hajek in his very clear division of the ethmoid bone; he divides the whole labyrinth into cells of the upper and middle meatus, and thus the old difficulties in settling the places of discharge for anterior, middle and posterior cells are removed once for all.

Cells of the upper meatus as well as the sphenoidal antrum discharge into the recessus spheno-ethmoidalis, and the pus of both cavities will therefore more frequently flow down to the naso-pharynx than that of any other cavity and produce the well known appearance of post-nasal catarrh. When the pus runs forward, it is nearly always found in the space between the middle turbinated body and the septum. That even this localization is not of absolute diagnostic value, must be repeated; only a discharge rapidly reforming after its removal and gushing out will signify its descent from one of the cavities in question. The anterior cells empty themselves into the hiatus semilunaris or into a posterior part of the middle

meatus, and their openings may thus be easily mistaken for those of the maxillary and frontal sinuses, as the openings of all these cavities are very close together.

One diagnostic sign to which I would draw special attention is the purulent and even fetid character of the secretion, in contrast with the more frequently muco-purulent or mucoid character of that from the maxillary antrum.

The *secondary disorders* of the mucous membrane are generally of less significance. A swelling in the region of the tuberculum septi, or posterior to this, arises often in the form of a lengthy ridge under the irritating influence of the pus. Though such irritation will be caused mostly by sphenoidal and posterior ethmoidal pus, it may in some cases arise from discharges of other origin, and be deposited in these places by capillary attraction.

Polypoid degeneration of the middle turbinated body is equally significant of suppurations of the anterior labyrinth and of the larger cavities. Isolated inflammations of the labyrinth hardly ever occur without the production of polypi, the mucous membrane of this region inclining particularly to edematous degeneration. When, in cases where no suppuration may have been apparent previously, multiple polypi in the region of the middle turbinated bodies are torn and not cut off, so that some bone is removed with them, it often happens that edematous growths within the opened cells or holes of the middle turbinates will be observed, a true sign of previous ethmoidal inflammation; the secretion in these cases is scanty on account of the advanced degeneration of the glands and vessels, so that it is practically hidden behind the tumors. In the same manner a production of polypi will often persist for a long time after the cessation of the ethmoidal suppuration.

The *rhinoscopic appearance* in sphenoidal suppuration alone scarcely differs from the normal, apart from the above mentioned occasional septal troubles; that of ethmoidal inflammation varies according to the different pathologic forms of labyrinthine disease.

The closed or ethmoidal empyema proper produces an expansion of the affected part of the labyrinth or its appendages (the bulla ethmoidalis or middle turbinals) and

gives the aspect of a bony bladder within, or by the side of the concha.

Latent open suppuration may exist without any visible effect, but in the majority of cases there are smaller or larger hyperplastic growths on the middle turbinal, and very often the participation of the deeper tissues becomes evident by the appearance of a considerable extension of the concha, whose surface is covered with granulations or polypoid degenerations, so that it occasionally appears double.

Distinct though these appearances may be, the diagnosis will never be sure until the presence of pus within the cavities is proved. For this purpose alone we make use of the probe. Though this instrument may prove roughness or caries of the bone or the presence of loose or necrotic particles, all these signs are of but secondary value.

As to the position which the probe has to occupy in the sphenoidal cavity, and the distance of this cavity from the nasal introitus, you will allow me to refer to the rules given in my treatise on nasal suppuration. Hajek gives a very instructive sketch, showing the angle of the probe with the nasal floor, whereby one should know the right situation of the probe within the cavity, but it is impossible to give absolute measures of distances and heights of the ostium, as these differ too much to allow of any certainty. In general the ostium is situated opposite to the posterior end of the upper turbinated body, and that the probe is in the proper position, will become evident only by the impossibility of moving it downward. The same is true as regards the control of its position in the ethmoidal cells, in contradistinction to the recessus spheno-ethmoidalis (for cells of the upper meatus) and to the middle meatus (for anterior cells). Sometimes it is useful to apply the probe by using Killian's specula.

The former can be reached from the recessus by a probe with a lateral bend, the latter from the middle meatus on both sides. A division of the sphenoidal antrum by a vertical or horizontal septum can thus be recognized by the probe and has a very great practical value. Whether this deformity is caused through the formation of a septum or by the dislocation of a posterior ethmoidal cell can scarcely

be made out in the living subject. Congenital abnormalities in the cavity may render their exploration quite impossible. The most extreme example of this condition is my case of an accessory sphenoidal sinus behind the left normal one, with an opening into the naso-pharynx. The great variety in the formation of the anterior cells leads to a confusion, especially with the frontal sinus, and this confusion is rendered so much more possible as the "frontal cells" frequently participate in the inflammation of that extensive cavity; but luckily (for it cannot always be avoided) a mistake is of no practical importance. More weight should be laid on the diagnosis of suppuration near the lamina papyracea, for not rarely this suppuration will lead to maxillary disease, and thus the affection of the lamina alone gives one of the most certain cues to diseases or the antrum of Highmore.

Such affection will sometimes simulate suppuration in a meatus with secondary caries of ethmoidal bone. But this disease will only rarely be found present alone. For the discovery of disease of adjoining cavities the greatest value attaches to a temporary tamponade, the application of which I need not further explain. In some cases to get sufficient room it is necessary to make a resection of the anterior part of the middle turbinal, and in ethmoidal suppurations this preliminary operation can rarely be avoided for proper treatment. In sphenoidal suppuration this operation is only exceptionally demanded.

Whatever cavity may be thus explored, its suppuration will not be demonstrated, unless pus is running down along the probe, or can be drawn or washed out by a cannula. The seriousness of the disorder and the further indications for its treatment will become evident by testing the state of the bone and soft parts with the probe. Diagnosis will naturally be much facilitated by some of the signs thus obtained, especially when the probe gets immediately through the mucous tissue into cavities, by the feeling of loose bone, etc.

In doubtful cases one must never forget the examination of both sides of the nose, as it is possible that an empyema of one ethmoidal labyrinth may discharge on the other side through a septal perforation.

The diagnosis of *manifest ethmoidal suppuration* break-

ing through the inner corner of the eye, in contradistinction to disease of the frontal sinus, will be made not so much by the localization of the orbital abscess as by the intranasal aspect, which will be unmistakable. In case of doubt, probing the outward opening of the abscess will confirm the diagnosis. As to other secondary diseases, for example, thrombosis of the venous sinuses, encephalitis, etc., I must forego their mention as not strictly belonging to the subject under discussion; and lastly a warning must be given against wrongly diagnosing ethmoidal sphenoidal suppuration when a malignant growth is really present, the early stages of which may simulate suppuration with inflammatory hypertrophies. Only great experience and attention to the whole course of the disease can prevent such an error.

LXVI.

THE ETIOLOGY AND DIAGNOSIS OF ETHMOIDAL AND SPHENOIDAL SUPPURATIONS.

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I have first to thank you for the great honor conferred on me. I accepted your invitation the more willingly as it gave me an opportunity of reporting further upon a method of treatment for extensive ethmoidal disease. It is eighteen months since this subject was last mentioned, and the report is already abroad that the method has been abandoned.

ETIOLOGY.

Suppuration in the ethmoidal and sphenoidal sinuses, as in the other accessory cavities of the nose, is usually due to acute rhinitis, and more especially to the severer forms of it, such as occur in the specific fevers. I need not enumerate all these. Influenza is well recognized as a prolific cause, and probably accounts for the frequency of these diseases in recent years. A greatly increased frequency seems to be a fact, and not to be entirely explained by increased zeal in diagnosis. Pneumonia, typhoid, etc., may also give rise to these affections, but probably a majority of these cases are due to ordinary colds. Catarrh and even suppuration in the accessory sinuses is probably not infrequent in connection with nasal catarrh, and chronic suppuration results when the mucous membrane lining the cells is severely damaged by the acuteness of the inflammation, when the bony wall of the sinus is affected, or when the swelling occurs around the opening of the cavity and prevents the free escape of the catarrhal products.

Three points deserve a word:

1. *The Question of Infection from other Sinuses.*—It has often been stated that the ethmoidal cells may become infected by pus coming down from the frontal sinuses, and

possibly also by pus from the antrum. That pus coming down the infundibulum should enter some of the ethmoidal cells which open into that channel, would at first sight seem highly probable, and yet I think this purely physical explanation leaves out of account a very important factor. The action of the ciliated epithelium lining the accessory sinuses does not seem to me to be sufficiently taken into account. Ciliary movement is a very great force. It is probably the great factor in removing the discharge from the nose, and it is certainly the means by which the secretion of the accessory sinuses is removed. A large sinus such as the antrum must normally secrete a considerable amount of fluid, and this will be greatly increased by catarrh. This secretion is entirely removed through a tiny opening at the top of the cavity, and its removal therfore depends entirely upon the ciliary action. Now if the cilia are able to remove secretion from a cavity it seems to me that it would be impossible for fluid slowly oozing down from another cavity, such as the frontal sinus, to enter the ethmoidal cells in opposition to the ciliary stream. Of course, when, as the result of extensive disease, pathologic communications exist between two sinuses, this argument does not hold.

It is also, I think, because this factor has been left out of account that wrong deductions have been drawn as to the frequency of sinus suppuration from the results of necropsies. Just before death—possibly some hours before—the action of the ciliated epithelium becomes enfeebled and possibly ceases, and thus it is to be expected that the cavities would in many cases contain secretion, especially if there has been any catarrh. If the patient had not died the cilia would probably have entirely removed this secretion, and therefore it is wrong to consider a little discharge in a sinus evidence of chronic suppuration.

2. *The Question of Ozena.*—There is perhaps even yet not complete agreement upon this subject, although the balance of opinion probably leans decisively to one side. In my own experience—and I have carefully observed these cases and taken great interest in them for the past five years—the discharge in ozena or atrophic rhinitis can be entirely stopped without in any way treating the sinuses in at least 80 per cent. of the cases. The treat-

ment consists in thorough cleansing of the nose and constant packing with antiseptic gauze. This packing of the nose would tend to aggravate rather than to cure suppuration in an accessory sinus, and if therefore by this treatment the discharge in ozena can be stopped, it follows, I think, that the sinuses cannot be held responsible for it. In about 20 per cent. of cases, or less, one or more sinuses contain pus, and in my opinion this is secondary to the ozena. The ethmoidal cells are rarely affected, but probably may become so when a large crust forms in the upper part of the nose and dams back the discharge into the openings of the cells. The sphenoidal sinuses are apparently more often involved. The fact that a large proportion of cases of sphenoidal sinus disease recorded in this country have occurred in atrophic rhinitis, points rather to the fact that in this affection the diagnosis is greatly facilitated, and suggests that a large number of cases of sphenoidal disease are overlooked.

3. *The Question of Nasal Polypi.*—Nasal polypus is sometimes the result of sinus suppuration when the suppuration has led to erosion of the mucous membrane and caries of the underlying bone. Sometimes probably the caries of the bone and the suppuration in the sinus both result from the same original cause. Sometimes also the polypi, by preventing the overflow of the discharge, may lead to an acute catarrhal suppuration becoming chronic, or drive the pus into the cavities. In this way polypi may become a source of chronic sinus suppuration, or may lead to its spread.

TREATMENT OF ETHMOIDAL SINUS SUPPURATION.

The treatment of ethmoidal suppuration depends upon the extent and situation of the disease. Thus the subject may be divided into 1: Suppuration in the anterior ethmoidal cells, (*a*) limited to one or two cells, (*b*) extensive involvement of the ethmoidal labyrinth; (2) suppuration of the posterior ethmoidal cells; (3) suppuration of the ethmoidal cells, with orbital fistula or abscess, or with cerebral symptoms.

I think it will be granted that in suppuration in the ethmoidal cells operative procedures are invariably indicated.

These may be divided into: (1) Minor intranasal methods, such as the opening of one or two cells under local anesthesia with sharp hooks or cutting forceps; (2) curettement of the ethmoid; (3) external operation.

1. The details of the minor intranasal methods are familiar to all of us. In the first place, any polypi or hypertrophies which may be present must be removed, together with the anterior end of the middle turbinate. This clears the approach to the anterior ethmoidal region, and the affected cell or cells must then be carefully located. At a subsequent sitting, the parts must be thoroughly anesthetized with cocain or cocain and suprarenal extract solution. In my opinion the freshly made solution of suprarenal extract prepared by the method of Peters gives the best results. When the anesthetic has sufficiently acted, the affected cell is opened with a pair of nasal scissors, or with a sharp hook such as Hajek's, and its wall subsequently cut away piecemeal with Grünewald's forceps. When there is not much bleeding the interior of the cell can be inspected, and the mucous membrane if extensively diseased, should be curetted. I think it is a great point to use the curette as little as possible. In the majority of cases the mucous membrane, unless very extensively diseased, will soon become healthy when free drainage has been provided, and its removal by baring the bone only delays the cure and opens the way to spread of the infection. After one or more cells have been opened in this way, a pause is necessary to allow the inflammatory reaction to disappear. Much edematous infiltration is commonly set up, and may last two or even three weeks, and this must be allowed to subside before further operation is undertaken.

A caution must also be given as to packing the nose for hemorrhage. This is very rarely required, and it is dangerous as it prevents the outflow of pus, and consequently may dam it back into other cells.

The great objection to this method is that it allows of very little being done at each sitting and consequently a large number of sittings are required. Blood soon obscures the view and the patient soon becomes intolerant, as in this region the anesthetic rarely extends deeply and

never completely removes the pain. The advocates of this operation, even those who maintain that there is no alternative method, admit that the tediousness of the treatment drives patients to give it up, at least as soon as the most urgent symptoms have been removed. Thus Hajek states that in extensive cases a "half-cure" is the most that can be expected and considers it is all that should be aimed at. He would keep such cases under observation after the pain and headaches have disappeared, removing polypi and hypertrophies from time to time and letting the discharge continue. This frank report of the results is, I believe, in accordance with general experience.

The method is useful in certain cases. It may be employed with advantage when the disease appears very limited, that is, when a cure may be anticipated after a few sittings. It is also the best method when serious or acute symptoms are present and when from age or other reasons a more radical procedure must be avoided. As a curative measure in cases of extensive disease it is both inadequate and dangerous.

2. *Curettement of the Ethmoid.*—The details of this operation I have already described elsewhere, and would now emphasize only a few points. The anesthetic, preferably gas and ether, must be light as in all operations on the air passages attended by hemorrhage, so as not to abolish the reflexes completely. The postnasal space should be plugged when the posterior ethmoidal cells are not affected. For scraping, ring knives should be used; much more can be removed with them and with much less force than with a sharp spoon. The blade of the knife should be directed outward, and fairly firm pressure may be exerted in this direction without danger. Should the orbital plate be perforated or removed, and the orbital periosteum exposed no ill effect will follow. No force at all should be used in scraping upward for fear of injuring the cribriform plate. This is a point I wish to insist on most strongly, as on it depends the safety of the operation. In a recent discussion one surgeon said that it would be difficult to push a large ring knife up to the cribriform plate. If the operation be performed under this delusion fatal results sooner or later are inevitable. The chief points to

ensure safety are to use a ring knife, large and sharp, which requires little or no force, and is very effective, and, secondly, not to scrape forcibly in an upward direction.

The operation must be continued until every piece of soft bone and degenerated mucous membrane has been removed. This may be completed by using a smaller size of ring knife with great care. On introducing the finger into the nose at the end of the operation it will usually be found that the antrum has been freely opened from the middle meatus so as to admit the passage of one or two fingers. It is further, I think, advisable to puncture the antrum from the alveolar border in all these operations. At the end of twenty-four hours the antrum is irrigated and clots and dèbris washed out. Should pus be found, a tube can be inserted and the antrum treated as for empyema. It may also be found, as already stated, that the periosteum of the orbit has been laid bare, and in the majority of cases it is probable that this scraping extends down as far as the orbital plate of the ethmoid. It is also probable that in a large number of cases the uppermost ethmoidal cells are opened. In a recent case, which I have shown to some of my colleagues, operation was performed for extensive suppuration and polypi in the anterior and middle ethmoidal cells. After the operation, a large dry cavity was formed in the upper part of the nose, and on examination the posterior end of the middle and the whole of the superior turbinate were fully exposed. This enabled one to locate the situation and extent of the large cavity in the anterior part of the nose, and demonstrated that the whole of the cells had been removed quite up to the cribriform plate.

After-Treatment.—The best after-treatment consists in doing as little as possible. The nose should not be packed unless required for hemorrhage, and then it is better to remove the packing next day and not replace it. After the first twenty-four or forty-eight hours the nose should be very gently irrigated. The packing has a tendency to prevent the outflow of any pus which may be present, and thus to give rise to septic infection and fever, and possibly is attended by the danger of infecting other sinuses. Certainly these troubles, and also suppurative otitis, seem

to be less since the packing has been discontinued. Syringing also, especially if force be used, may produce otitis, and therefore it must be carefully employed and watched.

Progress.—For the first week or two after the operation granulations which often seem extensive and edematous, may appear in the upper part of the nose and may be accompanied by suppuration. These are best left alone. Occasionally a piece of semi-detached mucous membrane or bone has to be removed after the operation; but granulations usually subside after a time. In the majority of cases a cure is obtained, and it is easier to speak decidedly in these cases than it is with regard to nasal polypi, for a case must be considered a cure if a large dry cavity forms in the upper part of the nose and all suppuration ceases, and the edema of the mucous membrane and polypi have been removed; whereas in speaking of a cure for polypi a considerable time must be allowed to elapse. Of course, a cure does not invariably result. The entire disease may not be removed or other sinuses may be affected; but in the majority of cases complete healing takes place in from two to three months after the operation.

Ill Results.—The following is a full account of the ill results that have been noted: In a small proportion of cases there has been a rise of temperature to 101°, or even higher, for a few days after the operation; this is probably due to slight septic absorption from the raw surface, and soon subsides. In one or two cases a temperature of 103° or 104° has been noticed, but has usually fallen within twenty-four or forty-eight hours, and in no case has been attended by serious trouble. Headache has been rare and has soon passed off, and is probably due as much to the anesthetic as to the operation. Suppurative otitis media has occurred in a small percentage of cases; it has only been noted when patient had previously suffered from the same disease and had never been severe. In a few cases adhesions have formed between the outer wall of the nose and the septum. These are often mere strands which, when healing has taken place, can be easily divided with the galvano-cautery. In one or two cases they have been very extensive, but beyond obscuring the view of the upper part of the nose apparently did little harm. They may be the result of somewhat unusually acute inflammation

following the operation, but in all probability they are also due to more or less injury in the septum. It is in this direction that if care be taken they probably may be avoided. It is possible they could be prevented by prolonged packing of the nose, but this for other reasons seems to me inadvisable. In one case, as already reported (see Proceedings of the Laryngological Society, London, December, 1900) an abcess formed in the lower or inner part of the orbit in connection with necrosis of the nasal portion of the superior maxilla, and had to be opened. For three months a sinus existed and then an incision was made into the orbit and a sequestrum removed, and the patient did well.

In commenting on this operation in the *British Medical Journal* and also in the *Centralblatt*, Sir Felix Semon mentioned that he knew one death had already occurred. There has been, so far as I am aware, only this one death, and in justness to the operation I must add that it was due, in my opinion, to avoidable causes, and therefore should in no way be allowed to depreciate the value of the operation. Indeed, further experience seems to me to prove that the operation is both safe and efficient, and at the present time nothing has been recommended which could replace it.*

3. *External Operation.*—The indication for this procedure is an abscess or sinus in the orbit in connection with disease in the ethmoidal cells. If urgent cerebral symptoms be present, I think operation by this method should also be recommended, but it should not be performed simply for ethmoidal suppuration. The operation is an easy one to carry out, and is somewhat similar to an operation for frontal sinus disease. An incision is made, commencing near the supraorbital notch, just below the supraorbital margin, curving downward and inward, and ending shortly below the inner canthus. It is carried at once down to the bone, and the periosteum is detached far back along the inner wall of the orbit. In this way the abscess in the orbit is sure to be opened, and if a sinus exists be-

*If any reader should know of a fatal case following this operation the writer would be extremely glad to be informed of it. Of course, nothing would be published without permission, and the report would be regarded as strictly confidential.

tween it and the ethmoidal cells, through a perforation of the lachrymal plate it will be exposed. With a fine sharp chisel the lachrymal plate should now be cut away so as to freely open the sinus and expose the anterior and middle ethmoidal cells. By curetting with a ring knife, either through the opening thus made or through the nose, guided by a finger passed in through the wound, the whole of the ethmoidal cells can be broken away; and it is possible definitely and precisely to clear out every ethmoidal cell as far back as the sphenoid. The bleeding is free, but by careful sponging every step of the operation can be carried out under direct view. When the operation has been completed I have closed the wound with a few interrupted stitches, allowing an interval for the passage of a large tube which is brought out at the anterior nares. After seven to fourteen days this tube has been replaced by a plug similar to that recommended for frontal sinus cases. The result has been excellent, a complete cure having resulted, and the scar is not very unsightly. I should not, however, be disposed to consider this as an alternative method to the one above recommended for all cases of extensive ethmoidal cell disease.

Summary.—From the above consideration, I should be inclined to draw the following conclusions:—(1) That minor operations under cocain anesthesia are to be recommended only in very limited ethmoidal cell disease; (2) that curettement of the ethmoid is the best operation in the large majority of cases; (3) that external operation is safest and best when urgent cerebral or orbital symptoms are present.

TREATMENT OF SUPPURATION IN THE SPHENOIDAL SINUS.

The method of treatment depends in the first place upon how the diagnosis has been effected. Whilst operating for polypi or suppuration in the posterior ethmoidal cells it is always advisable to pass the finger well up through the post-nasal space into the posterior part of the nasal fossa, to examine the posterior ethmoidal region and the anterior part of the sphenoid. In doing this, caries or softening of the bone forming the anterior wall of the sphenoidal sinus may be detected and the softened bone may easily give

way on pressure. Should this occur, a large opening should be broken into the sphenoidal sinus with the curette. In three cases I have successfully accomplished this. One may be briefly related as an example:

A girl, aged 19, was first seen in July, 1897, suffering from nasal obstruction and intensely fetid discharge from the left side of the nose. Large semi-gangrenous polypi were seen far back in the left nostril. As the polypi recurred several times after removal with the snare, the patient was admitted to the hospital, and general anesthetic administered. The polypi seemed to grow from the posterior part of the ethmoid, which was extensively carious, and easily broken down with the finger and the curette, the posterior half, or more, of the middle turbinate being removed. Whilst exploring and curetting this region, a large carious patch was felt on the anterior part of the sphenoid, which gave way on slight pressure, and the tip of the finger suddenly entered a large cavity. Careful location showed that this cavity could only be the sphenoidal sinus, and the opening into it was further enlarged by breaking down the carious anterior wall with the curette and finger. The patient was acutely ill for a few days with high temperature, sickness and headache, but recovered without special treatment, and at the end of a week was well. Subsequently there was no recurrence of the polypi, and the fetid discharge entirely ceased. After the nose had healed, a large irregular opening in the anterior wall of the sphenoidal sinus could be plainly seen from the front; this opening has remained permanent, and there has been no recurrence of the disease. The case illustrates the importance of examining the anterior wall of the sphenoid with the finger in all cases of suppuration in the posterior part of the nose, the ease with which the sinus may be opened in some cases by the finger and curette, and the permanence of the opening that is made. A further point of interest is that the polypi in this case were semi-gangrenous and intensely fetid, and another exactly similar case has occurred in my practice. The cause of this is not easy to explain, but the fact may be of diagnostic importance.

This method of treatment, however, is only applicable to cases in which there is caries of the anterior wall of the

sinus. In the majority of cases the first step in treatment, if it has not already been taken in connection with the diagnosis, is to clear the approach to the natural opening of the sinus so as to bring it into view. This means removing the posterior half or more of the middle turbinate, except in a few cases of atrophic rhinitis, where the middle as well as the inferior turbinate is atrophied when the ostium of the sinus may be visible from the front. When the ostium of the sinus has been brought into view a cannula should be passed into it and the sinus irrigated. Then the probe should be introduced, and if no definite disease can be detected in the sinus, it may be treated for a time with daily irrigations with a mild antiseptic, such as boracic acid. If this treatment does not effect a cure or greatly reduce the discharge within ten days or a fortnight, a few applications of strong antiseptics may be tried. The best of these is a fairly strong solution of sulphate of copper. A few drops of a 2 per cent. to 5 per cent. solution of sulphate of copper may be injected into the sinus, left for a few seconds, and then thoroughly washed away with boracic acid. This means is warmly recommended by Hajek. I have been very pleased with it in cases of antral suppuration, but have no experience with it in sphenoidal sinus disease. It seems well worthy of a trial.

Should treatment by irrigation fail, or should the opening of the sinus be extremely small, or should caries of the sinus walls be detected, an operation must be undertaken. The best method is to enlarge the natural opening of the sinus with some such instrument as Hajek's hook under cocain anesthesia and direct illumination. With these hooks the anterior wall is broken down by pulling in an anterior and downward direction, and the detached fragments can then be removed with Grünwald's forceps. Subseqently the opening can be enlarged rapidly by cutting it away with a pair of Grünwald's forceps. In this way a large opening can be made or, if desired, almost the entire anterior wall of the sinus can be cut away.

Should the sinus contain polypi or granulations its interior can be scraped out. Here, as with the other sinuses, it is best not to attempt to remove the entire lining membrane, even where it is extensively diseased; healing will

usually take place when free drainage has been established, and this can be hastened by irrigation with simple antiseptic solutions and the occasional application of a stimulant or caustic, such as a strong solution of sulphate of copper.

The results of these operations as far as my small experience goes are good. The opening made remains permanent and the interior of the sinus soon becomes dry. Of other methods of operating I have no personal experience, and must therefore speak very briefly. It has been recommended by several specialists that where the opening of the sinus is inaccessible the anterior wall may be bored through from the front. This seems to me an extremely risky procedure, owing to the extremely great variability in size of the sphenoidal sinus. I do not think it could ever be safe to bore through the anterior body of the sphenoid in the hope of reaching the sinus, unless its position and extent had been carefully located beforehand by passing a hooked probe in through the natural opening of the sinus.

It has also been suggested that the sphenoidal sinus can be reached through the ethmoidal cells by means of an external operation such as I have just described. In a case recently reported, an incision was made in the inner angle of the orbit, the ethmoidal cells exposed, and then instruments were thrust blindly through the ethmoidal cells toward the sinus. This of course must be condemned. It may be possible to clear out the ethmoidal cells regularly and systematically as above described until the sphenoidal sinus is reached, and then to continue inward and open and clear out the sphenoidal sinus. This operation is easily performed upon the cadaver, but in the living subject the amount of bleeding, the small diameter, and great depth of the wound would make such an operation extremely tedious and difficult.

Lastly, Jansen recommends opening the sphenoidal sinus through the antrum. Of this method also I have had no personal experience, and would therefore rather not speak. In conclusion, this sinus is only a single and not very important cell. It may be treated by curetting, guided by the finger, or opened as a single suppurating ethmoidal cell would be under direct illumination.

Discussion.

Dr. N. G. Haring, Manchester, thought that sphenoidal empyema occurring alone was often syphilitic; otherwise it was generally associated with ethmoidal disease. Curetting the ethmoidal cells so as practically to destroy them had sufficed to remove all headache and depression in 10 cases of which he had notes, but in only 3 of the ten was the discharge quite cured. *Postmortem* records showed that pus in accessory sinus was not necessarily very detrimental to health. Operations should only be performed to relieve distinct symptoms, and no absolute cure of discharge should be promised, although great benefit might fairly be expected.

Dr. McBride, Edinburgh, felt that his experience of the affections under discussion was too limited for him to assume the roll of critic. The difficulties of diagnosis were great in frontal and ethmoidal suppuration, as the cases were frequently complicated. The relation of polypus formation to nasal suppuration was a point as yet undetermined. Points of diagnosis were easily arranged on paper but difficult to apply in fact.

Dr. Greville McDonald, London, confined his remarks to the questions concerning the posterior ethmoidal and sphenoidal cells. After referring to the paucity of cases where a positive diagnosis of sphenoidal suppuration was possible, he referred to the persistence of pus between the middle turbinal and septum as evidence of posterior ethmoidal cell disease, and pus lying on the posterior nasopharyngeal wall, especially if it could be traced upward in front of the anterior face of the sphenoidal sinus, as evidence of sphenoidal empyema. He then related a case of sphenoidal disease where operation on the posterior ends of the turbinals, to secure irrigation, was followed by orbtal aneurysm, which was subsquently cured by ligature of both carotids, undertaken by Mr. Charters Symonds. Finally he related an empirical method of gaining irrigation of the posterior superior regions of the nose, by allowing the patient's head to hang backward over the end of a couch, and pouring, not syringing, a small quantity of 5 per cent. boroglyceride solution into the nostrils. In this way, very cautiously tried, he had frequently secured the hapiest results, and in some cases had cured disease of many years standing.

Dr. P. Watson Williams, Bristol, believed that influenza was the immediate cause of the great majority of cases of ethmoidal and sphenoidal sinus disease. The diagnosis was often a matter of very great difficulty in these cases, for though the symptoms might be highly suggestive of ethmoidal cell or sphenoidal sinus disease, it often happened that at the time one saw the patient the discharge did not happen to be exuding, and it was not justifiable to open the suspected cavities unless continued observation made the extension of disease almost certain. He considered that a point of some value in differentiating between posterior ethmoidal cell and sphenoidal sinus disease, lay in the tendency for pus from the latter to lie on the roof and posterior wall of the naso-pharnyx, while in the former it was more often found in the posterior choanae and lying on the soft palate. In treating ethmoidal cell disease he generally relied on gas or cocain anesthesia, as it was then possible to observe the parts one was operating on.

Speaking of the relative frequency of suppuration in the sphenoidal sinus and posterier ethmoidal cells, Dr. W. Jobson Horne, London, considered it had been overstated. His remarks were not applicable to the anterior ethmoidal cells. Suppuration in these cells was commonly part and parcel of disease in the frontal sinus itself, with which they were anatomically and developmentally associated. The over-estimation of the frequency of pus in the posterior ethmoidal cells and in the sphenoidal sinus was to be explained by the statistics being based upon *post-mortem* appearances, which had been misinterpreted, The presence of muco-purulent matter in these cells did not in itself amount to disease of the cell wall; the presence of the matter could readily be explained by inspiratory suction immediately before death. He had frequently examined the sinus in a dead horse, and had met with muco-purulent matter suggesting at first glance disease; but in the absence of any evidence of morbid change in the walls of the sinus, disease had to be excluded.

Dr. Adolph Bronner, Bradford, thought that Dr. Lack's treatment of ozena by packing of the nares might lead to secondary disease of the accessory sinuses, which in even one or two years might cause recurrence of the nasal

ozena. Chloroform was preferable to ether, as the latter seemed to cause greater hemorrhage and local secretion of mucus. Dr. Bronner thought that local treatment without a general anesthetic, and with forceps, etc., should be tried first, and then local applications of aristol, or spirits of wine or formalin, used for several months before the larger operation was performed. Deaths from radical treatment were more common than was generally believed. In cases with very offensive discharge there was probably syphilitic caries.

Dr. Scanes Spicer, London, agreed generally with what had been advanced by Dr. Lack; except that which concerned position of operation in those cases where radical measures were necessary. The speaker strongly advocated the performance of all such operations on these sinuses in the ordinary rhinologic sitting position in an armchair, in order to secure the maximum safety and efficiency. The whole field of operation was then (with intranasal mopping) in view practically the whole time—an immense advantage considering the proximity of the cribiform and orbital plates. For some years now he had used that position exclusively for these cases. With a really efficient anethetist, anesthesia with gas and ether followed by choroform had been repeatedly maintained for one hour and a half, and without any untoward or even threatening result. Likewise he did not favor plugging the posterior nares during operation, that procedure causing the blood to be dammed forward into the nose, so that the manipulations were carried on blindly in a pool of blood. It was quite easy to keep the air passages clear, even if hemorrhage were free, and for that purpose he directed one dozen new, coarsely-pored sponges the size of a tangerine orange to be prepared for every operation, and one assistant was toled off to keep these rinsed and squeezed out dry in a bowl by the patient's right side. These were used with the fingers by both operator and anesthetist.

In this way the experienced nasal surgeon could in most cases see where he was, and avoid dangerous parts and do exactly what he wanted under all anesthesia—an immense advance in the treatment of these conditions.

The speaker had on Dr. Lack's recommendation tried Meyer's adenoid ring knife in breaking down ethmoidal

cells and polypi, but he had returned to Dr. Grünwald's curettes and forceps, as he thought the ring knife was very clumsy and less easily controlled here. On two occasions after extensive ethmoidal operations he had noticed a temporary stiffness of the eyeball on the affected side which had passed off in the course of a few days. He had for many years now adopted the principle of following up the disease, whether pus or polypus, into the cells of the ethmoid or sphenoid or wherever situated, usually after resection of the middle turbinated bone. Both operator and patient had in nearly every case been satisfied with the result, great relief having been given to symptoms and intervals of three, four, and five years immunity from polypus and suppuration secured. In some severe and complicated cases he could claim such prolonged immunity as to amount to a radical cure, though he fully recognized the necessity of giving a most guarded prognosis on this point, because it was always difficult to make sure of having removed every trace of the disease.

In really experienced hands there was practically no risk from the operative procedures themselves, carried out in the way he had described, though there might be considerable danger from the disease for which the operation was undertaken. In any case the patient was safer when the retention of pus under pressure was guarded against by free drainage of diseased cells.

No doubt great stock would be made in certain quarters of the rumors of unfavorable results which had been brought forward that day. It should be observed that no information was forthcoming as to the conditions of the patient for which the operation was done, the name and status in rhinologic disease of the operation, the circumstances of the operation, or the position in which the patient was placed for operation, whether it was a blind grope in a prize packet bag or done under full illumination. These were pre-eminently cases for the experienced rhinological expert. He disclaimed any desire to assert that an unfortunate termination might not attend the proceedings of the most experienced rhinologists, but it was notorious that nowadays many persons utterly inexperienced in nasal surgery were rash enough to dabble in these difficult cases, while others equally inexperienced made great

capital out of any unfavorable result, tried to alarm the public and instil distrust into them of nasal surgery.

Sir Felix Semon, London, summarized the impressions which the discussion had made upon him, and dwelt (1) upon the diagnostic difficulties in these cases; (2) the operative results and risks; (3) the ciliary theory advocated by Dr. Lack, which seemed to offer him a very satisfactory explanation of the astounding difference of the frequency of affections of the accessory sinuses as observed during life and after death. He had never doubted that the frequency with which pus had been found by very reliable observers in these cavities after death in cases in which during life no corresponding symptoms whatever had been observed, was only explicable by the assumption that the matter had found its way into these cavities after death, or, more probably, during the agony; but the *modus operandi* had not been clear to him, and he thought Dr. Lack's explanation was very ingenious, and very likely to be true.

Dr. Herbert Tilley, London, thought that the chronic antral suppuration was not uncommonly the prime factor in inducing suppuration in the ethmoidal cells, and quoted a case in support of this view. He thought Dr. Lack's theory of the action of the cilia in preventing pus entering the ostia of the sinuses of little practical importance, because pus in contact with the nasal mucosa would quickly produce edema and inflammation, and this would bring about retention of pus under pressure and the latter would be forced into any neighboring opening of a sinus. In the diagnosis of sphenoidal sinus suppuration the whole middle turbinal should be removed, so that irrigation could be, as a rule, easily carried out, thus rendering the diagnosis more easy than would otherwise be the case. The sitting position under anesthesia was invaluable, because the patient was in the usual position in which examination was made and the parts seen in their natural relationship. His experience was that all cases of chronic frontal sinus empyemata were associated with suppuration of the anterior ethmoidal cells.

Dr. Wild, Zurich, desired to recommend Professor Killian's rhinoscopia media as a most valuable aid both in the diagnosis and treatment of diseases of the accessory

sinuses. With the long speculum it was often possible to see where the pus came from and to inspect the openings of the ethmoidal and sphenoidal cells, to examine them with a probe, or brush them out with a canula.

Dr. F. H. Westmacott, Manchester, thought that instead of speaking of suppuration of the anterior or posterior ethmoidal cells, and of the frontal and sphenoidal sinuses with those cavities, they should rather group the cases as suppuration of the cells of the middle, or of the superior meatus respectively. Pus from the cells in either meatus was practically certain to infect the proximate cells. The sphenoidal ostium could not be seen without removal of the whole of the middle turbinal. He advocated the sitting posture for operation (under cocain) as one's ideas of topography were undisturbed. The frequency of these affections in Manchester was probably, as in Vienna, largely a matter of climate. The presence of ciliated epithelium in sinuses which contained pus *post mortem* might, he thought, be considered proof that the pus had found its way in during life.

Professor Onodi, Buda-Pesth, referred to the method proposed and carried out by Jansen, of opening the sphenoidal sinus through the maxillary antrum. He had examined twenty-five skulls, and found that the operation was anatomically possible in only three of the twenty-five. Under normal conditions the operator would either first enter the nasal cavity on the mesial side, and then the sphenoidal sinus, or he would damage the vessels and nerves which passed through the spleno-palatine foramen. The ordinary nasal route was the only safe way to the sphenoidal sinus.

Dr. Sam Lodge, Halifax, referred to three fatal cases of sinus suppuration. A man of 65 had sarcoma of the maxillary antrum, and protrusion of the eyeball. *Post mortem*, double sphenoidal empyema was found with erosion of the posterior wall and purulent meningitis. The case was not operated on. A mill girl of 28 was operated on for empyema of the frontal sinus. Pus and granulations were found, but head symptoms continued and the empyema returned. At a second operation an erosion of the sinus wall was found leading to a large subdural abscess, which was evacuated, but the patient died of men-

ingitis. A man aged 31 had syphilitic erosion of the wall of the sphenoidal sinus. No operation was performed. He died of meningitis.

Professor Grünwald, in reply, agreed with Dr. McBride that the diagnosis was difficult, and often was only made in the course of treatment. The diagnosis was much more difficult than the treatment. He agreed with nearly everything Dr. Lack had said, but could not endorse his recommendation to operate in the recumbent position, and under general anesthesia. His experience as to the comparative rarity of these diseases agreed with that of Dr. Felix Semon. If it had not been for the influenza epidemics, he would not have gained the experience necessary to enable him to stand there and discuss the subject. The sphenoidal sinus should be treated by the straight open way of the nose; any other method was dangerous.

Dr. Lack thought his operation had the double advantage of clearing up the diagnosis and furthering the treatment. He greatly preferred the prone position for the patient.

SECTION OF OTOLOGY.*

LXVII.

THE STUDY, TEACHING, AND PREVENTION OF DISEASES OF THE EAR.

By William Milligan, M. D., Aberd., President.

Allow me in the first place to offer to you a hearty welcome to Manchester and to the Owen's College, and in the second place to express the hope that the discussions which have been arranged and the papers which are to be read, may prove interesting and profitable to one and all.

The importance of otology as a special department of the healing art, the rapid strides which have been made during recent years in the evolution of the principles and practice of aural surgery and the ever-increasing number of professional men who are devoting their lives to its study will, I think, be regarded as reasons which justify the establishment, this year, of a section devoted entirely to the consideration of problems of otologic interest.

An extended and perfected knowledge of the anatomic relations of the middle and internal ears, and a more accurate acquaintance with the paths along which pathogenic organisms are prone to travel to vulnerable structures contiguous to the ear have placed the practice of aural surgery upon a much more scientific basis than was formerly the case.

Emancipated as aural surgery to-day is from the yoke of procrastination and quackery it is rapidly assuming a more and more important place in the practice of our profession, and I take it that the gathering here to-day of so many well-known workers in otology is a tribute to the desire we all have to contribute so far as lies in our power, by discussion and by argument, to the advancement of our specialty.

Whilst fully recognizing the important strides which

*British Medical Journal, August 30, 1902.

have been made in past years, it is incumbent upon us to look ahead, and to endeavor by individual and by united effort to extend the usefulness of our department, and to attempt to unravel some of those problems which enshroud the pathology and treatment of certain forms of ear disease. The stimulus given to British otology by the formation of the Otological Society of the United Kingdom, has, I believe, already borne fruit, and will I trust in the future bear more and more.

The mass of otologic literature which to-day is to be found flooding medical and surgical journals, both general and special—an evidence at once of the increasing interest in this subject—is nevertheless becoming an increasing burden in the everyday work of the aural surgeon, who is anxious to keep abreast of the times, and be conversant with the work of his *confreres* in this and other countries. The problem of keeping pace with the mass of literary work would, I think, be much simplified were the otologic societies of Great Britain, France, Germany, Austria, Italy, America, and Spain, to form an international bureau for the advancement of otology, whose business would be to publish a biennial epitome of the principal work done in these several countries, such epitome to be under the supervision of competent collaborators elected by the respective otologic societies. The necessity for systematic instruction in otology is also, I believe, becoming more and more appreciated by the senior student and junior practitioner. The fifth or clinical year, which is now obligatory, should tend in time to stimulate this desire, and the facilities now afforded for the teaching and for the study of otology in all great medical centres is vastly superior to what existed ten years ago. Still greater encouragement should, I think, be given to the study of the special organs, and not the least the study of the ear, and I look forward to the time when the various degree-giving bodies may encourage the taking of an honor's M. D. degree in otology, in ophthalmology, in laryngology or in dermatology.

The extraordinary frequence of ear disease in children and its consequences both from the social and national point of view are such that no excuse I think is needed for emphasizing the necessity of insisting that every qualified

practitioner as he leaves the portals of his university or his college carries with him some definite credential that he is competent to deal with the more ordinary affections of this organ of special sense. To any one who holds a hospital appointment the prevalence of ear disease following the exanthemata, must again and again have left its impress, and the knowledge that early and rational treatment might, and in all probability would, have saved many an ear and many an individual from permanent disability in the battle of life, cannot but cause a pang of regret.

Are we as a body of aural surgeons doing all in our power to mitigate this evil? Are we bringing the weight of our combined authority to urge the powers that be to insist upon a knowledge of the principles and practice of the more ordinary forms of ear disease by the medical student of to-day and of to-morrow? As a small aid to this consummation I am convinced that if the authorities of fever hospitals were to exact that every candidate for the post of house-surgeon or house-physician should be required to show a certificate testifying to his acqaintance with the principles and practice of ear disease a great step would be taken—a step which would doubtless have its practical bearing in the early detection of ear disease amongst those suffering from the exanthemata, and in the more efficient and more scientific treatment of suppurative lesions.

Gentlemen there is much to be accomplished. Many fields of inquiry are open and are yearning for willing investigators. To the scientific worker the field of pathology and of bacteriology has an almost limitless horizon. The practical bearing of an increased acquaintance with the exact mode of origin and the course of disease is so obvious as to require no accentuation. Our duty lies not only in the sphere of endeavoring to relieve the sick and suffering, but also in the greater sphere of preventive medicine.

How much serious ear disease is preventable we know full well. Let us as a body co-operate to provide ever-increasing educational facilities to the rising generation of medical men, so that at least one scourge to suffering humanity may be lessened by increased acquaintance on the part of the profession with the principles and practice of aural surgery.

LXVIII.

THE AIMS AND LIMITATIONS OF INTRANASAL SURGICAL PROCEDURES IN THE TREATMENT OF CHRONIC NON-SUPPURATIVE MIDDLE-EAR DISEASE.

By P. McBride, M. D., F. R. C. P., F. R. S. E.,

SURGEON TO THE EAR AND THROAT DEPARTMENT OF THE EDINBURGH ROYAL INFIRMARY, AND LECTURER ON DISEASES OF THE EAR, NOSE, AND THROAT, IN THE UNIVERSITY OF EDINBURGH.

It has so frequently been my lot to discuss the question before us that I fancy my views are fairly well known to those who are interested in them. At the same time, since I have been honored by the request to act as one of the introducers of this discussion, I feel that a renewed confession of faith is called for. Perhaps I can best fulfil this obligation by recapitulating the summary of my conclusions as they appear in my work on *Diseases on the Throat, Nose and Ear.*

1. Let adenoid vegetations be treated in all cases of catarrhal middle ear disease. The same is true of naso-pharyngeal catarrh.

2. In affections of the anterior nares and pharynx let operative treatment only be employed, if it is indicated on rhinologic and laryngologic grounds, apart from the aural condidition. It is quite probable that very marked obstruction of the anterior nares may cause catarrh of the naso-pharynx and Eustachian tubes; but in this case the obstruction will be so marked as to warrant interference for other reasons.

Now the above sentences represent the views I have held and expressed for many years, and I have so far seen no reason whatever to modify them, although I shall now venture to amplify them as shortly as possible.

First, then, with regard to the question of adenoids, it will be observed that I consider they should be removed

in all cases where the middle ear affection is of a catarrhal nature. I have repeatedly pointed out that a relatively small amount of adenoid tissue may produce a very decided effect upon the hearing, provided it be so placed as to press upon the Eustachian tubes. Frequently enough it causes no other symptoms. On rhinoscopic examination, it may be seen wedged, as it were, between the tubal orifices and reaching right up to them. In these cases, I fancy some definite effect is exercised upon the circulation of the middle ear. At least, this is the conclusion I have come to from the following facts:

1. We often meet with a much larger amount of adenoid tissue, not lying close up to the tubes, but occupying more the middle of the naso-pharynx, which causes no ear symptoms whatever.

2. After removal of adenoid tissue causing deafness with marked indrawing of the tympanic membranes, the hearing often becomes good, but the membranes frequently remain indrawn.

As you all know, there is another variety of chronic non-suppurative middle-ear disease which is not catarrhal, I refer to sclerosis. Here we have no indrawing of the membrane, which may indeed be indisguishable from the normal, but which sometimes shows a delicate flamingo tint. It is unnecessary at present to dwell upon the characteristics of one of the commonest and at the same time most intractable affections the aurist is called upon to treat. It is perfectly well known that in many of these cases the patient's hearing is made worse by anything which disturbs the general tone, notably by loss of blood, fatigue and nervous shock. This form of ear disease is more common in adults than in children, but it does occur in the latter. If the youthful victim of sclerosis be affected with adenoids, I think the propriety of operating is a question upon which divergent views may legitimately be held. Of course, we meet with a certain number of cases in which middle-ear catarrh and sclerosis coexist, but the latter also exists in childhood and youth in a predominating and even a perfectly pure form. In such cases I think the operator will often be disappointed in the result and the relatives frequently more than disappointed. To give an illustrative case. Some years ago

I saw a young girl with progressive deafness, the membranes were little if at all altered in position, and showed the delicate flamingo shade which is of such unfavorable prognostic significance. She had also some adenoids, not however in contact with the Eustachian orifices, and to which I fortunately called her medical advisers attention. She did not improve in my hands, went to London, was operated upon, and, I understand has not been benefited. In this case I deliberately gave it as my opinion that no good was to be expected from operating and that harm might possibly result. The sequel, so far as I have been able to learn the facts, proved me right in this instance.

We next come to the question of nasal operations other than for the removal of adenoids. It will be within the recollection of those present that toward the end of last year Sir Felix Semon published two very remarkable lectures on the Principles of Local Treatment in Diseases of the Upper Air Passages.* Many abuses were touched upon, and among others the frequency of nasal operations on patients who had no nasal symptoms, but who suffered from middle-ear sclerosis, was justly condemned. Sir Felix called attention to the relative rarity of deafness as an effect of nasal obstruction, such as occurs in many cases of nasal polypus. This is a fact to which I had more than once previously alluded, and I think all experienced aurists will agree with Sir Felix Semon and myself on this point. Moreover, when deafness does occur, it is usually of a purely catarrhal character, sometimes associated with free exudation in the middle ear. It will be within the recollection of many present that these striking lectures were followed by a considerable amount of correspondence. Here it would be out of place to consider this, excepting so far as it relates to middle-ear disease. In the *British Medical Journal* of November 30th, 1901, Dr. Edward Law practically expressed his agreement with the views of the lecturer, as did also Dr. Milligan,† and not a single dissentient voice was raised among otologists. On December 14, 1901, the editor of the *British Medical Journal* was good enough to publish a letter from myself. I am not so egotistical as to believe that it

*British Medical Journal, Nov. 2nd, 1901.

†Op. cit, December 14, 1901.

is more worth quoting than the contributions of others, but my excuse for doing so lies in the fact that I propose to found my subsequent argument in some degree upon the absence of any replies to the challenge contained in it. The passage to which I desire to call your attention to is as follows:

We have heard generalizations as to the benefits of nasal surgery in obstinate ear cases, but we have rarely, if ever, had details. For these I therefore venture to ask with a mind perfectly open to conviction. I would accordingly propose that some of the many who seem to put their trust in attacking the nasal passages for relief of deafness should give information on the following points with regard to their cases:

1. The appearances of the tympanic membrane.
2. The hearing distance as observed at first visit.
3. The effect upon hearing distance produced by successful inflation, either by means of Politzer's bag alone, or by way of the Eustachian catheter.
4. The duration of any improvement so produced.
5. If such improvement is produced, of course inflation ought to be continued until no further benefit results. Has, under these circumstances, additional improvement followed a nasal operation?
6. Of course it is presumed that the hearing for bone conduction and high notes has been tested—with what result?
7. What was the nature of the nasal operation?

I must apologize for taking up so much of your space, but answers to the above queries would tend to convert those who are now sceptics or to place them in a stronger position. If no such answers are forthcoming, then I fear that we must conclude that a vast amount of nasal operating has been done with no result, and we may consider, without injustice, that those who are its advocates for the cure of otherwise incurable ear disease have no case.

Now it so happens that I have operated on numerous noses for nasal symptoms, and that I have examined many cases of chronic deafness due to middle-ear catarrh and to sclerosis respectively. I had always been prepared to assume the possibility of marked improvement in advanced chronic catarrhal deafness from the removal of nasal ob-

struction, although I have not had much evidence of it in my own practice. The failure of any of the numerous school of nasal operators for ear disease to respond to my challenge, I must freely confess, has rather shaken my remnant of belief just referred to. At the same time I am still prepared to justify nasal operations undertaken for the removal of an obstructing lesion in patients who suffer from middle-ear catarrh. Please mark, however, that I mean definite obstruction, and that by definite obstruction I understand a condition which is of sufficient importance to give the patient discomfort referred to the proper quarter, that is, the nose. I am, however, not prepared to justify operations either upon the septum or turbinated bodies in those cases where, although there may be slight irregularity of the one or a trace of hypertrophy of the other, the patient in answer to leading questions denies any uneasiness referable to his nose or nasal respiration. In sclerosis of the middle ear, uncomplicated with catarrh, I feel practically certain that we can never have improvement from any operation performed upon the upper air passages; but even here I am prepared to admit that the existence of the middle-ear disease need not necessarily be a contra-indication if the nasal obstruction be causing much inconvenience. It is, however, well to bear in mind that any great nervous shock, more particularly if associated with much loss of blood, may increase the aural trouble.

To return to the challenge contained in my letter above referred to, the fact that not a single writer was found prepared to give even one carefully observed case of improvement following and due to nasal operations other than the removal of adenoids, tends to produce a most disagreeable impression. I hardly like to suggest that it has made me doubt the accuracy, ability, and reasoning powers of a section of those whom I should wish to respect and to think well of. Yet, what is one to believe? I know—you all know—that an immense number of patients, the victims of incurable middle-ear disease, have operations performed with a view to curing their deafness. In such cases the nasal passages are often sufficiently pervious so far as the patient's comfort is concerned, and the Eustachian tubes are frequently open. The middle-ear is the seat of the

fibroid or osseous changes, and in sclerosis the labyrinthine capsule may be affected as well.

The question must naturally arise as to what possible effect the removal of a small septal spur or a slightly enlarged turbinated can have upon the middle-ear condition, whether the latter be the result of sclerosis or catarrh. In view of the failure of the advocates of such methods of treating ear disease to come forward in answer to the strictures passed by Sir Felix Simon and others, I am driven to assume that no one wishes to confess himself an upholder of this doctrine. It may very well be asked of me why I pass strictures upon a course of action which no one defends. My answer is simply that I do so because I have reason to believe that a very considerable number of patients have their noses operated upon with a view to curing what every sensible aurist ought to know to be (so far as present knowledge goes) an incurable form of deafness.

Now, I do not wish to make any charges against those who differ from me, but I should at the same time like to impress upon them that they ought to have the courage of their convictions. Further, they ought to be able to show some reason for the faith that is in them. If they cannot do so then I have no hesitation in stating that, to put it mildly, they allow themselves to remain in a very equivocal position.

Again, I may be met with the charge of tilting at windmills; but if there be any one bold enough to make it, I fear it merely indicates a limited experience on his part, provided he practices in Great Britain. What is the usual history of the victim of middle-ear sclerosis after he has left an adviser who has informed him accurately as to his condition and prospects? He very naturally wishes to have a second opinion. It may be that he consults a gentleman with strong views as to the importance of nasal treatment, and whose ideal of what a normal nose should be is high. It matters not that he has no nasal symptoms, it matters not if the Eustachian tubes be pervious. If only there be a little hypertrophy of the mucous membrane or a trifling irregularity of the septum, it is enough. A nasal operation is performed. Sometimes it is to produce great benefit, on other occasions it is to be the last resort and

may do good, while sometimes there is regret expressed that the patient did not come earlier, when the malady might have been arrested. I have now been long enough in practice to have heard the history of many such cases; sometimes I had examined them years before, given an unfavorable prognosis and advised as to treatment. I am sure the gentlemen who treated them would not always be gratified to hear their expressions of opinion. Of course, I know as a general rule views expressed by patients are not founded upon a proper scientific basis, and therefore valueless. Still, when a troublesome operation has been performed, when the hopes of improvement held out to justify it have been shattered, when previously an opinion had been given that no operation was required, we must excuse some degree of dissatisfaction.

But perhaps some of us who are inclined to protest against nasal operations—except for cure of obvious nasal obstruction—as a method of treating middle-ear sclerosis are wrong. If we be wrong, then it is the duty of those who have achieved results which confute our views to publish them. I have discussed this matter before and I know full well how skillfully the main issue can be put aside; platitudes may be made to cover much. Thus a gentleman may get up and defend his position by the statement that the cure of middle-ear disease by nasal surgery is so generally admitted that he thinks it quite unnecessary to give concrete examples. Another who practices as a rhinologist, may tell how he has produced so much benefit to the hearing of his *clientele* that against his wish, he has acquired a large practice in ear diseases. Yet a third will, perhaps, speak of latent obstruction and negative pressure, which like certain terms in metaphysics are difficult to understand in combination. The third hypothetical debater generally leads to the fourth. Here we have the calm assumption that rhinology is a thing by itself, and that only a privileged few can fathom the inexplicable something which is necessary for its comprehension. It may be that what has been revealed to the babes and sucklings has been hidden from the wise and prudent. The analogy may be carried a little further. To certain theologians logic is anathema; to some rhinologists it seems to be the same.

Now let us turn for a moment, in conclusion, to the indications for nasal operations which appear to me legitimate.

I have already referred to adenoids; it is obvious that, where a tumor of another kind exists in the naso-pharynx, it ought to be removed if possible, whether the patient be deaf or not. Still, keeping to the parts which are examined by posterior rhinoscopy, any obstructing diaphragm should be attacked. Hypertrophied posterior ends of the turbinated may cause considerable discomfort. I have sometimes thought too that they may definitely irritate the region in the neighborhood of the Eustachian tubes. Indeed, I think that some really definite evidence to this effect has once been published, but my memory does not allow me to say whether cases have been recorded in which removal of the hypertrophied extremities was demonstrated to have done more than could be accomplished by inflation, etc. Turning now to the parts accessible by anterior rhinoscopy, marked nasal obstruction, whether due to the septum or hypertrophy of the turbinated mucosa—if bilateral—requires to be dealt with on general grounds. When unilateral, it depends upon circumstances whether an operation should be undertaken, and the chief of these circumstances is the amount of discomfort experienced by the patient. These, be it observed, are all common sense indications, which would apply to persons with perfect hearing as well as to the deaf. A question of some interest is whether so-called negative pressure occurs frequently in the naso-pharynx in presence of very marked nasal obstruction. I think that where it does occur there can be no doubt that posterior rhinoscopy will reveal diffuse congestion. The last-named combination associated with catarrhal middle-ear disease would, I think, justify the operation, but it would also cause such symptoms as to give the patient very appreciable discomfort. There is a different class of cases which should not be put in the same category. I refer to persons who have what may be called for want of a better name a catarrhal tendency of the upper respiratory tract. The whole region from just within the nasal orifices to the larynx and even trachea is congested, and there is hypersecretion. Here if there be marked nasal obstruction, it will be proper to operate, but

if there be only a moderate degree of enlargement of the turbinated, or a small amount of irregularity of the septum, I very much doubt whether anything can be expected from surgical interference, even if the condition be associated with middle-ear catarrh. I have purposely refrained from reference to empyema of the accessory cavities, although here operation is sometimes required before inflation can be safely begun.

I have thus freely expressed my views because it appears right that the position of those who object to promiscuous nasal operating for ear disease should be clearly understood.

I shall be willing to reconsider the whole matter if any one will adduce cases which have been carefully observed, and in which such careful observation goes to prove that nasal operations (as distinguished from naso-pharyngeal) *per se* produced benefit. I do not refer to subacute middle-ear catarrh, but to chronic deafness due either to advanced catarrh or sclerosis. We know that in such case the prognosis depends largely on the effect of inflation. I would ask for cases in which nasal operations alone have produced distinct imrovement in hearing power after other remedies (including inflation) have definitely failed. If such proof cannot be produced, nasal operating, independent of interference or the relief of nasal symptoms, stands condemned.

LXIX.

THE AIMS AND LIMITATIONS OF INTRANASAL SURGICAL PROCEDURES IN THE TREATMENT OF CHRONIC NON-SUPPURATIVE MIDDLE - EAR DISEASE.

By Urban Pritchard, M. D., F. R. C. S.,

Aural Surgeon and Professor of Aural Surgery, King's College Hospital.

The intimate anatomic relations which exist between the naso-pharynx, the Eustachian tubes, and the nasal cavities afford a ready explanation of the frequency, with which ear disease is found to be associated with affections of these parts. This is more particularly the case when such affections cause an interference with the due ventilation of tympanum through the Eustachian tubes, or when they form a starting-point for the extension of catarrh through the tubes to the tympanum.

Of late years considerable attention has been directed toward these points with much advantage to treatment. But, as is always the case in new departures, there is a certain tendency to overrate the value of such treatment, and thus lead some over-zealous enthusiasts to operate in every case of deviation from the normal without sufficiently considering whether any benefit to the ear can possibly result from operative interference. It is well, therefore, that this subject should receive our most careful attention and consideration; and in order to discuss the problem systematically let me begin by recapitulating the various forms of non-suppurative diseases of the middle-ear.

In the present state of our knowledge I think it will be most convenient to group these into the following classes:

1. Chronic middle-ear catarrh and its results.
2. Sclerosis.
3. Intratympanic adhesions from acute and subacute nonsuppurative inflammation.

4. Mixed cases of the above.

1. In the first of these conditions—namely, chronic and middle-ear catarrh—the establishment of free nasal breathing and the removal of any cause of irritation of the nasal mucous membrane are two most important points in treatment. The removal of nasal stenosis will, as a rule, be best accomplished by surgical interference, such as by removal of nasal polypi, of hypertrophy of the inferior or middle turbinals, or spurs and deflections of the septum.

(*a*) Nasal polypi must always be taken away, not only on account of their producing stenosis, but also because they constitute a source of irritation of the mucous membrane.

(*b*) True hypertrophy of the posterior ends of the inferior turbinals almost invariably calls for surgical interference on account of their close proximity to the Eustachian tubes.

(*c*) Hypertrophy of the rest of the inferior and of the middle turbinals requires to be operated upon whenever there is any considerable stenosis, or where this condition produces irritation of the mucous membrane.

(*d*) Spurs and excessive deflections call for operation whenever stenosis is produced therefrom; and, even though there may not be any sufficient obstruction to the nasal breathing to justify such treatment, yet in cases where spurs or deflections are causing local irritation of the mucous membrane these should be removed.

There is scarcely any need to say that foreign bodies, including rhinoliths, being sources of excessive irritation, must be taken away. And, finally, a spur or deflection may occasionally need to be operated upon in order to free the passage for the introduction of the Eustachian catheter.

2. When we come to the treatment of sclerosis, a condition which I firmly believe, as insisted upon by Politzer, to be the result of an osseous change in the bony capsule which encloses the internal ear, I wish to say most emphatically that no operation on the nose can have the least effect, except perhaps that temporary benefit to the hearing power which has been noted occasionally to follow from depletion through the hemorrhage. In a pure case of sclerosis there is no catarrh, and any operation on a deflection or

on a spur which does not seriously affect the nasal breathing is, in my judgment, absolutely uncalled for.

The question of removing nasal polypi and turbinal hypertrophies purely on their own account is a different matter altogether, and need hardly be considered in this connection, as they are rarely met with in cases of pure sclerosis.

3. When the midle-ear affection has arisen from adhesions through acute, or subacute, non-suppurative inflammation of the tympanum, operative interference on the nose is useless, for the damage has been already done and, practically, we find that it cannot be undone, though in a few rare cases some improvement can be gained by operating on the tympanum itself.

4. In the last group, that of mixed classes where the first, the true, catarrh is combined with either of the other two, the question of operation on the nasal cavities must be determined on the same lines as those for the simple catarrhal division.

To sum up: Intranasal surgical procedure in the treatment of chronic non-suppurative middle-ear disease should be limited to those cases in which the nasal defects are producing substantial stenosis, or such irritation of the mucous membrane as does affect—or, if extended, will affect—the Eustachian tubes; and therefore, in sclerosis, operations on the nasal cavities are not only uncalled for, but they are absolutely useless.

Discussion.

F. Rohrer, M. D., Zurich. My confreres, Dr. McBride and Dr. Urban Pritchard, have given such a clear and profound explanation of the subject that I will be very brief. I am in full accordance with my two colleagues who have just spoken, but will give you briefly my own opinions. If my views are different from others I hope, at any rate, you will under no circumstances accuse me of being the "advocatus diaboli." Intranasal surgical procedures are indicated by two chief reasons. The first is dependent upon the function of the nose; the second on the function of the ear, and this is nearly in every case related to the first. We often can find pathologic changes in the nose which demand surgical treatment, without

any accompanying changes in the ears. If, however, disease of the middle-ear requires treatment of the nose, surely *ipso facto* the nose itself in such cases requires energetic surgical treatment on its own account, due to its respiratory function. This fact is clear, because the majority of non-suppurative middle-ear diseases proceed from the nasso-pharynx along the Eustachian tube either "per continuitatem" or "per contiguitatem." In other cases we see the same degenerative process going on at the same time in the mucous membrane of the middle-ear, Eustachian tube, and naso-pharynx. These cases are due to a "tropho-neurosis," and are known under the collective noun of "sclerosis." All chronic non-suppurative middle-ear diseases demand a careful examination of the nose, and treatment of this organ often causes a decided amelioration of the hearing, a diminution of the noises, and disappearance of the feeling of oppression. Surgical procedure in the nose is necessary if the ventilation of the nasal and pharyngeal cavities is abnormal. It can be too great or too small; it can be obstructed by neoplasms, hypertrophies, excrescences, exostoses, hyperostoses, synostoses; it can be affected by ulcerative pathological processes under the influence of an infectious dyscrasia or diathesis. Deviations of the septum, hypertrophies, papillomata, polypi in the different regions, adenoid vegetations, rhinoliths, foreign bodies all demand surgical procedure, and all can be associated with non-suppurative middle-ear disease. But I am fully aware that one must exercise care in such operations. Occasionally one gets acute inflammation of the middle-ear after surgical procedure, due to infection through the naso-pharynx and Eustachian tube; so when one operates one must remember that harm as well as good can be done.

Dr. Dundas Grant, London, considered it a good practical rule that operations should not be performed on the nose on account of chronic non-suppurative disease of the middle-ear, unless they were called for on account of the nasal obstruction as such; he was of the opinion that he had seen such affections of the middle-ear relieved by removal of nasal obstruction. He was thus in agreement with Dr. Urban Pritchard. He recalled a case (which he had narrated in the discussion on a similar subject at

the British Medical Association meeting at Ipswich) in which the removal of a cartilaginous outgrowth from the left side of the septum on account of obstruction of that nostril, was followed by restoration of hearing in the left ear, which, although the patient had not complained of it at the time to Dr. Grant, he stated to have been deaf up till the time of the operation. Dr. Grant had more recently had a case in whlch the middle-ear catarrh was accompanied by the most intense vertigo and disturbance of equilibrium. This was invariably relieved for the time by the passage of the Eustachian catheter, but no lasting relief was obtained until the obstruction in the right nostril was removed by resection of the anterior part of the inferior turbinal; the patient recovered his stability of equilibrium to such an extent that for the first time in his recollection he was able to go through St. Gothard's tunnel without inconvenience. Dr. Grant expressed two cautions with regard to the removal of nasal obstructions; the first was that there existed such a condition as subjective nasal obstruction in which the patient complained of such being present, although the nasal passages were really free. This occurrence might help to entrap the surgeon into performing operations on the nose. The other was that oblique ascending outgrowths from the septum might look very formidable to the eye, as if calling for immediate removal, but on account of their direction they not only did not impede the entrance of air, but they possibly rather favored it, by directing it upward and backward. In regard to their offering difficulties in the introduction of the Eustachian catheter, he directed attention to his remarks on the subject in a paper presented at the last meeting of the Association, in which he indicated means by which various obstructions in the nose might be "dodged" by the catheter. He was convinced that a great deal of misunderstanding and waste of time in discussion had arisen from the fact that some of those who took part had erroneous ideas as to what was meant by sclerosis of the middle-ear. He was sure that no one would knowingly perform operations on the nose for the cure or prevention of sclerosis of the middle-ear, who really understood the nature of the affection. In some cases apparent benefit was obtained; either because the sclerosis was accompa-

nied by a congestion of the labyrinth, which was relieved by the hemorrhage, or there was a neurotic element, and counter-irritation resulting from the operation produced an effect on the nervous system which was sometimes an injurious one—a kind of traumatic hysterical paresis; and in others there was the condition of anemia rather than congestion, and the hemorrhage made it worse. In reply to Dr. McBride's suggestion that his requoting the case which he narrated two years ago at Ipswich, indicated that he had within these two years seen no cases of chronic catarrh of the middle-ear benefited by intranasal operation, Dr. Grant protested against such an inference being drawn; he quoted the case because it was remarkable in the fact that owing to the unusual fact of the patient not having complained of his dullness of hearing until the treatment (nothing whatever except the removal of the nasal obstruction) had been carried out and the improvement noticed. Naturally if the patient had complained of the dullness of hearing, the usual inflation or catheterization would have been practiced, and the case as pure evidence of the beneficial effect of intranasal operation would have lost its value as an unintentional experiment.

Dr. Lambert Lack, London, said that having listened to this discussion there seemed to him to be very little difference between the two parties when the differences were reduced to words, but there was a general impression that there was a very great difference in practice. Much depended upon the speaker's own opinion as to what amounted to real nasal obstruction. To try to give a more definite turn to the discussion, Dr. Lack advanced the dictum that the nasal obstruction per se was never a cause of deafness or ear disease. He urged the following reasons.

1. Numerous cases were met with in which nasal obstruction, partial or complete, existed, and had existed for many years with normal hearing and normal ears.

(*a*) Stenosis of anterior nares due to lupus or syphilis. He had seen at least thirty instances of this condition during the past year, and it was the greatest rarity to observe any impairment of hearing or indrawing of the drums. The nasal obstruction in these cases was of all degrees from partial to complete.

(*b*) For many years past he had treated all cases of ozena (the total number of which he estimated at nearly 100) by packing the nose with strips of gauze so as to produce complete nasal obstruction. This had never produced deafness; on the contrary cases of pre-existing deafness had improved under this treatment.

(*c*) In nasal polypi, even in children, deafness was notoriously rare. The same held true of nasal obstruction due to deflected septum or spurs.

2. Growths in the postnasal space, for example, adenoids, caused deafness, but here there was nasal obstruction or negative pressure at the orifices of the Eustachian tubes, the plane of the slight obstruction produced by adenoids being posterior to the orifices of the tubes.

3. In cases of deafness with indrawn drum, associated with nasal obstruction, a certain amount of Eustachian obstruction would invariably be present, and he asked why should the negative pressure existing in the postnasal space exert its effect on the drum when the tube was obstructed and not when it was patent, and how was it that the greater the obstruction of the tube the more marked the indrawing of the drum.

Surely Eustachian catarrh and obstruction with or without more or less middle-ear catarrh was the cause of the ear trouble in these cases.

4. To the objection that nasal obstruction only exerted its full effect upon the ear in children in whom the instincts of nasal respiration were so strong, he replied that children with simple nasal stenosis were usually not deaf. Children with adenoids and also adults were often deaf, but only when the tubes were blocked.

5. The objection that the improvement which followed operations on adenoids could only be explained on the theory that a negative pressure was abolished was equivalent to saying that a theory set up to explain one fact was contradicted by other facts—so much the worse for the other facts. He suggested that theory might be wrong, and that the improvement following adenoid operations might be better explained by the disappearance of Eustachian obstruction. The immediate improvement so often noted depended on hemorrhage, which produced rapid opening of the tubes, and the ultimate improvement de-

pended on complete disappearance of the Eustachian catarrh.

He did not look forward to the immediate overthrow of this theory of negative pressure which had lived long enough to become venerable, but hoped to show the very slender grounds upon which it rested, namely, the fact that a clear case could not be produced to show that it was ever the one factor present, and that in every case Eustachian obstruction rather than negative pressure was the cause of indrawn drums.

Dr. Scanes Spicer, London, thought there was a general consensus of opinion that operations in the nose should not be done in advanced cases of catarrhal hyperplastic disease with adhesions, or in sclerosis, or in labyrinthine disease with the idea or promise of curing deafness. He had for many years made this quite clear to every patient. Yet he strongly advocated the rectification of nasal stenosis in the early stages of catarrhal otitis, especially when recurrent, and before permanent hyperplasia and adhesions had ensued. Also there were mixed cases in which catarrhal processes were superadded to sclerotic and labyrinthine disease, and in which the patients should not be refused the chances of anything that would reduce or arrest the catarrhal process, and so save what hearing remained, though it should be made quite clear that nothing could be guaranteed as to improving the deafness. Dr. McBride had suggested certain tests being applied before submitting a deaf patient to nasal operation. The speaker did not regard these tests of much practical value, because in the doubtful cases it was not the degree of deafness to watch or tuning fork, but (1) whether the hearing for conversation was worse with a head cold, (2) whether there were frequent and recurrent or chronic head colds, (3) if there were evidences of nasal stenosis shown by alar collapse on inspiration—that afforded the true criteria for nasal interference.

It was the greatest fallacy to assume that there was no substantial stenosis or definite obstruction without some "gross nasal lesion." In many very obstructed noses there was absolutely no "gross nasal lesion." A high degree of stenosis was often due to several factors, trifling in themselves, producing by summation a great effect. This

stunting of the nasal framework from the disused nose during growth, arrested evolution of nostrils, alar collapse, rhinitis, erectile tumefaction, edema, spurs, deflections. deviations and dislocations, adenoids, enlarged tonsils, and other conditions, might in varying combinations and degrees form a high degree of nasal obstruction, and, though any one of these factors might be slight in any given case, and no "gross nasal lesions" present, there might nevertheless be extreme stenosis. It was the fact of obstruction that had to be determined in relation to catarrhal otitis, and that obstruction should be rectified if it was still capable of doing further harm to the ear or otherwise to the individual. He thought that the opponents of the nasal stenosis theory were singularly deficient in logic in this matter, for they had no consistent explanation to offer as to how the removal of their "gross nasal lesions" improved catarrhal deafness. In fact, removing "gross nasal lesions" had no effect upon catarrhal deafness unless such lesions caused obstruction, and if the operator did not remedy obstruction, his nasal operation was futile as to catarrhal ear disease. It must, therefore, be inferred that the action of the opponents of the nasal stenosis theory in attacking nasal lesions in catarrhal otitis was merely empirical, and not based on any rational principle, in contradistinction to that of the rhinologists; while the former were unable to offer any alternative theory to that of nasal stenosis and negative pressure, which, indeed, harmonized with all the facts.

Modern rhinology explained how nasal stenosis caused excessive fluctuations of air tension in the nose and naso-pharynx; how these changes of air tension (especially negative pressure) caused chronic hyperemia and edema of all vascular tissues behind the obstruction; how in these latter changes the tissues of the pharyngeal end of the Eustachian tube shared; and how this vascular edematous swelling caused closing of the Eustachian tube. Given a chronically closed tube, it would be conceded generally that exhaustion-otitis and hyperplasia followed. Catarrhal rhinitis and nasal trumatisms were probably the commonest prime exciters of stenosis; but, however originating, the corollary of stenosis was excessive fluctuation of air tension in the nose and naso-pharynx

with every breath. The incessant action of this negative pressure or suction force on the walls of the intranasal vessels gradually broke down their vasomotor control, and caused such hyperemia and edema of the pharyngeal mouth of the Eustachian tube as to close it up. If there were frequent colds in the head, the rhinitis, and so the stenosis, were increased and perpetuated, until there ensued in time a hyperplastic rhinitis, a hyperplastic salpingitis with occlusion of the ostium and lumen of the tube and a hyperplastic otitis media with adhesions and ankyloses.

With reference to the question which has been asked as to what was substantial stenosis or definite obstruction, the following facts should be borne in mind: (1) Nasal passages which were ample in an infant would, if development were arrested from disuse, be insufficient or stenotic for the same child at 6. (2) Nasal channels which would be ample in calibre for a subject weighing 6 st., would be totally insufficient for a subject of 12 st. (3) Nasal channels which admitted enough air during easy breathing at rest might be quite insufficient when the same subject was doing active work and forced breathing. (4) Nasal channels, ample by day, might, from redistribution of fluids at night, be totally obstructed, and compel mouth breathing.

Yet noses were emphatically declared to be "absolutely normal" by those ignorant of rhinology, because they did not find "gross nasal lesions," such as adenoids and polypi, which alone they were accustomed to deal with empirically; whereas the great factor of stenosis or obstruction was overlooked, allowed to run riot and do all the damage of which it was capable, until its effects culminated, finally and hopelessly, in a contracting hyperplastic otitis, with adhesions and incurable deafness.

[The speaker handed a round photographs of his apparatus and the tracings taken, to demonstrate conditions of air tension in the nose and naso-pharynx. The apparatus consisted of a manometer, Marey's tambour, kymograph, and pressure bag. These charts showed the degree of normal fluctuations of air tension in a series of normal nose breathers. They next showed how those fluctuations were increased in obstruction, and that the increase was *pari passu* with increasing obstruction, indeed, that

stenosis easily trebled and quadrupled the normal fluctuations of air tension. They also showed that the negative pressure of inspiration in stenosis not only exceeded the normal, but also increased disproportionately to the increase of positive pressure of expiration. A further very important series of curves showed the fact that when the nasal stenosis was so extreme as to compel mouth breathing there were practically no fluctuations of pressure in the naso-pharynx, therefore no negative pressure to cause hyperemia and edema of the Eustachian tube, and hence a complete explanation of the fact that had been so triumphantly and frequently paraded by the opponents of the nasal stenosis theory of catarrhal otitis, that in congenital atresia of the nares and extreme cases of obstruction from polypi or other causes there was sometimes no catarrhal deafness. The charts also showed that fluctuations of air tension were increased (1) by approximation of the ala to the septum, as in alar collapse; (2) by rhinitis; (3) by septal deviation. Lastly, the tracing proved that when one side of the nose was obstructed by rhinitis or septal deviation the fluctuations of pressure on that side were greater than on the opposite side and hence would explain on the stenosis theory why the catarrhal deafness was usually worse on the side of the obstructed nose.]

Mr. E. Cresswell Baber, Brighton, agreed on the whole with the indication for intranasal surgery in chronic non-suppurative middle-ear disease laid down by Dr. McBride and Dr. Urban Pritchard. He thought, however that in cases of chronic non-suppurative middle-ear disease in children, in which inflation did not improve the hearing, adenoids, if present, should be removed, but a correspondingly unfavorable prognosis must be given. He had not met with so many cases in which operations in the nasal cavities had been performed in sclerosis of the middle-ear as some members seemed to have seen. He found that for practical purposes it was convenient to divide the cases under consideration into classes: (1) Those in which inflation improved the hearing power. In these nasal obstruction might be removed with benefit to the ear. (2) Cases in which the hearing did not improve by inflation. In these, operations on

the nasal cavities was not to be recommended for improving the hearing. The most it could do which itself was doubtful, was to prevent the deafness from increasing. By making use of the inflation test he had avoided considerable disappointment in the treatment of these cases. A third class of cases existed in which it might be necessary to remove synechiae or other obstruction in order to obtain access to the Eustachian tubes to treat the ear trouble. In speaking of nasal obstruction he referred to real obstruction only, in which the patient was unable to breathe comfortably through the two nostrils with the mouth closed. He suggested that Dr. Spicer should publish the observations which he had brought before the meeting.

Mr. T. Mark Hovell, London, said that he considered that the patency or otherwise of the Eustachian tube to Valsalva's inflation gave the key to the answer as to whether the removal of nasal obstruction was likely to benefit the condition of the ear in case of deafness. If the Eustachian tubes were closed to Valsalva's inflation the removal of the nasal obstruction should be undertaken as part of aural treatment. He considered it immaterial whether the air-way through the nostrils was straight or tortuous; if free air-way existed that was sufficent. In any case of nasal obstruction he considered that, when possible, a free air-way should be obtained irrespective of the existence of ear disease.

Sir Felix Semon, London, assured the meeting of the reality of his statement with regard to the frequency with which he saw intranasal operation preformed in cases of pure, incomplete, and often enough unilateral nasal obstruction in cases of deafness, tinnitus, etc., whilst the naso-pharyngeal cavity was perfectly normal. He was certainly not an opponent to intranasal operations when there were legitimate grounds for believing that catarrhal processes actually extended from the nose through the naso-pharyngeal cavity, but he would continue strongly to oppose operations in such cases as he had mentioned first. With regard to Dr. Spicer's experiments, he hoped they would be published in full, when he would study them attentively. He confessed he had not been able to follow Dr. Spicer's arguments sufficiently, but whatever his theories were, the view that

nasal stenosis, pure and simple, could have that unfavorable influences upon the ear which was ascribed to it by Dr. Spicer was negatived by the results of practical experience, as in cases of multiple nasal polypi or in congenital diaphragms of both choanae, and as now futher evidenced by the negative result—so far as the production of deafness was concerned—of Dr. Lambert Lack's packing of the nose in cases of ozena. The speaker concluded by proposing that a committee should be nominated in which the different sides should be represented, and which should practically investigate, on the basis of Dr. McBride's challenge, the aims and limitations of intranasal operations in chronic middle-ear disease. At a later stage of the proceedings he changed the venue of this proposal, which met with general approval, by promising to bring it before the Laryngological Society of London for conjoint action with the Otological Society.

Dr. Herbert Tilley, London, thought it waa a matter for congratulation that all the speakers agreed that in cases of sclerosis of the middle ear no intranasal operations should be undertaken with a view to improve the hearing; such a unanimity of opinion was not present at the Ipswich meeting two years ago when the same subject was discussed, and he hoped that the future practice of otology would truly reflect the opinion which had been expressed in the matter that day. Personally he could not recall to mind a single case of sclerosis of the middle ear which had been in the least benefited by intranasal treatment. Whilst holding a strong view of the matter, he was equally certain that certain cases of catharral deafness were benefited by removal of marked nasal obstruction which assisted in keeping up a catarrh of the nasal mucosa. A large nasal crest and anterior end of an inferior turbinal were shown which were removed from a deaf patient with very great and permanent benefit to his hearing. The speaker agreed with Mr. Baber that the cases which were likely to improve by intranasal treatment were those in which the degree of deafness varied from time to time and in which temporary relief was produced by inflation of the tympanum. In such instances various degrees of moist catarrh were present. He congratulated Dr. Spicer on his endeavor to prove the presence and importance of "negative

pressure" as a prime factor in the causation of catarrhal deafness, but was bound to confess the laboratory experiments scarcely corresponded to the condition of things in life, for example, presuming that there was a certain degree of obstruction to nasal respiration and that in the experiment this produced a certain movement in the manometric column, which, according to Dr. Spicer, indicated a sucking or dragging force on the nasal mucosa; this force would be infinitely less in degree in real life, because the patient would immediately open the mouth and so reduce intranasal negative pressure to practically nothing.

Mr. C. H. Fagge, London, said that simple nasal obstruction was so often absolute for long periods without deafness, that it was difficult to believe that nasal obstruction did cause deafness without naso-pharyngeal complication, and therefore no operation on the nose should be lightly undertaken to cure deafness when the naso-pharynx was normal. He confessed he had learnt nothing from a practical point of view from the previous speakers, as regarded the amount of nasal obstruction demanding operations. He could not understand why some of the previous speakers had seen no cases in which extensive intranasal operations had been undertaken in cases of sclerosis and extreme chronic catarrh, because even in his small experience he had, much to his regret, seen a proportionately large number of such cases. He failed entirely to see how removal of a slight nasal obstruction, often one sided, could influence deafness. He had operated for removal of adenoids on two cases of sclerosis in children, giving a guarded prognosis, and he found that in both cases the result was very bad; in fact deafness immediately increased and for a long time did not return to the condition before operation, which result he attributed to hemorrhage acting on the general health. He was certain that the theory of causation of deafness through mechanical obstruction of the tubal orifices by adenoids was impossible, because deafness was not often seen in cases with marked adenoid masses and was extremely common in small engorged masses far removed from the tubal orifices. In all cases the process was infective, producing a naso-pharyngitis and Eustachian salpingitis. Mr. Fagge failed to understand what Dr. Dundas Grant

meant by "subjective" obstruction, and asked for a definition of its pathology, for he considered that a disease which had no pathology, at least theoretical, had no existence.

Dr. Kerr Love, Glasgow, thought the issues in the discussion had been obscured by the difficulty of distinguishing sclerosis of the middle ear from catarrhal conditions and by the difficulty of defining what nasal obstruction was. Assuming that these distinctions could be made, he thought the cases under discussion might be divided into three classes:—(1) Cases of sclerosis; in these they were all agreed that operative interference was useless; (2) cases of deafness, in which no subjective feeling of obstruction was complained of, even after the patient had been told how to observe these—here he did not think operation was likely to do good; (3) cases of deafness in which both subjective and objective evidence of nasal obstruction existed. Here operation should be resorted to, and, in many cases, improvement would follow. Two practical guides in prognosis were: (1) That improvement followed the use of the inflation bag; (2) that the deafness varied with the presence or absence of cold in the head.

Dr. Adolph Bronner, Bradford, thought that intranasal operation for treatment of ear disease should only be adopted when there was catarrh of the naso-pharynx and Eustachian tube. In these cases only could any improvement be made. Of course, real intranasal obstruction should be removed for other obvious reasons. How removal of a small spur of the septum could possibly improve the hearing Dr. Bronner could not understand. It was a great pity that a unanimous opinion as to when intranasal operations were called for could not be obtained. It was extremely unpleasant that a patient on getting a second opinion should be told that an intranasal operation should have been performed long ago.

Mr. Richard Lake, F.R.C.S., had but little to add to what he had said two years ago at Ipswich. He did not consider Dr. McBride justified in his assumption that as no replies had been made in the press to his letters, thereby it was proved that no one could produce the cases asked for. For his own part he declined to enter into discussions in the public press at anybody's bidding. He

also said that a more accurate knowledge of the pathology of middle-ear sclerosis had put an end to all hope of improving it by intranasal surgery, but formerly he had undoubtedly operated in such cases. He referred to a case in which draining the frontal and maxillary sinuses had been followed by improvement in the hearing.

Mr. W. H. Kelson, London, said the results of intranasal operations were apt to be disappointing if there was little or no improvement on inflation; if the patient was anemic, and with the increasing age of the patient. From their relation to the pharyngeal opening of the Eustachian tubes one would expect improvement from removal of hypertrophies of the posterior end of the inferior turbinate bodies, but this was rarely the case. In plethoric individuals who were improved by inflation good results were sometimes obtained by intranasal operation, but this was probably due to the beneficial effect of the local blood-letting.

Mr. A. L. Whitehead, Leeds, agreed entirely with Dr. McBride's conclusions, but would like to know whether a a case of sclerosis and catarrhal deafness in which there was no improvement after inflation but progressive deterioration in hearing power, would not be regarded as a suitable case for operation if nasal obstruction existed.

Dr. L. Hemington Pegler, London, felt compelled to retain an open mind upon this subject in reference to certain forms of chronic catarrhal deafness. He identified himself with the position taken up by Dr. Dundas Grant, who had just referred to a case corresponding as closely as possible in all particulars with some in his own experience. Many patients suffering from impaired hearing volunteered the assertion that they felt much improved after having had their obstructed nasal passages cleared. Doubtless these were amongst the so-called catarrhal cases, but it could scarcely be assumed that there was nothing more to be learnt in the pathology of chronic non-suppurative disease. The improvement generally referred to the hearing power for conversation, and was often difficult to measure accurately, but cases resembling those described by Drs. Grant and Tilley could not be rare in the practice of many others of those who attended hospital clinics. As Mr. Lake had remarked, these

might doubtless have accepted Dr. McBride's challenge, but refrained from entering the lists through motives best known to themselves.

The President said that as the discussion had already lasted so long he would not detain the meeting by making many observations. He considered that the discussion had proved of value in that it had elicited what appeared to be the unanimous verdict of all the speakers that in genuine sclerotic catarrhal conditions of the middle-ear intranasal operations were useless and were even harmful. In chronic non-sclerotic catarrhal conditions of the tympanic mucosa, where inflation improved the patient's hearing power and where some genuine respiratory difficulty was complained of by the patient, intranasal surgical procedures were of value and at times markedly so. He welcomed the formation of a committee to investigate this important subject, and hoped that the results of the labors of such a committee would be to lay down somewhat more precise rules than at present existed for guidance in the treatment of such cases.

Dr. McBride expressed pleasure that so many of the speakers were in agreement with him. He thought it impossible to criticize Dr. Scanes Spicer's experiments until they had been published in full and there was an opportunity of carefully studying them. In reply to Dr. Dundas Grant and Mr. Cresswell Baber, he had only one word to say and that was, he urgently insisted upon the desirability of having an authoritaive pronouncement of opinion from a suitable committee, as suggested by Sir Felix Semon.

Dr. Urban Pritchard had only one point to add, Dr. McBride's reply not necessitating any official reply from him. He would like to call attention to the large proportion of cases of adenoids in which some nerve as well as middle-ear deafness was noted, and in which the benefit from operation was practically nil; in these cases congenital syphilis was present, often proved by subsequent interstitial keratitis.

LXX.

REMARKS ON CHOLESTEATOMA OF THE MIDDLE-EAR.

By Dundas Grant, M. A., M D., F. R. C. S.

SURGEON, CENTRAL LONDON EAR AND THROAT HOSPITAL.

It must have happened to all who have had much experience in otology to have met with one or two cases in which the attic of the tympanum is lying freely open, the outer wall having completely disappeared, while the cavity is entirely lined by a smooth, pearly-white membrane. Occasionally the loss of bone extends to the posterior-superior wall of the osseous meatus, leaving an opening through which a cavity much larger than the antrum, though including this, is visible, the walls being covered by the same kind of shiny, pearly-white membrane. The patient, though dull of hearing in that ear, may be free from all discomfort except the occasional accumulation of desquamative epithelial products, which are easily removed. In such cases there has generally been a history of chronic suppurative inflammation of the middle ear of several years duration, characterized by the occasional occurrence of severe headaches and the extrusion of white, macerated, skin-like formations.

The course of events in such cases has been the development of the so-called cholesteatoma, consisting essentially of a membrane lining the natural or pathologic cavity in the petrous bone, desquamating so that the cavity is filled with epidermoid scales, the central ones of which have broken down into cheesy masses containing cholesterin crystals. Under the influence of moisture or inflammation the desquamation is increased, and the cavity thereby filled and distended; the pressure causes the walls of this to give way at their weakest part, and, if as in the fortunate cases we are describing, this is the part presenting toward the tympanum and external meatus, the bone in those places is gradually eroded until the cavity is

laid so freely open that there is sufficient room for the exit of the contents.

The course of formation of such a cholesteatoma appears to be as follows: As a result of a suppurative inflammation extending into the antrum and adjacent cavities, the lining membrane becomes covered with granulations similar to those on an ulcer on the surface of the body; in some cases, especially the tuberculous ones, progressive caries of bone results, and very little or no attempt at healing takes place. In the absence, however, of such a dyscrasia, the smaller bony trabeculae give way, and a comparatively large cavity remains, lined with granulation tissue. As the suppuration subsides, the edges of the perforation in the tympanic membrane may become cicatrized, and it is possible for the granulations to subside, and a return to a fairly normal mucous membrane is effected. Should, however, the perforation in the membrane be peripheral, and there is a ready continuity between the epithelium of its outer surface and the granlations on the wall of the tympanic cavity, the same changes take place on the surface of healing ulcer of the leg. The cuticular epithelium proliferates over the granulations from the periphery onward until the whole ulcer, if not too large, is covered with a cicatrix, which may be a fair substitute for skin. In the middle-ear this process has been traced, as shown by microscopic examination, to a considerable extent into the tympanic cavity; there is no reason why it should not continue through the aditus into the antrum, at first reaching only those portions of the walls of the cavity which are nearest this orifice, then gradually extending over the parietes until the whole cavity is lined with an epithelial cicatrix. Sometimes in performing the radical mastoid operation one finds the cavity in this condition. At other times, as in a case I operated on a few days ago, the part nearest the mastoid surface is filled with granulation tissue, and the shiny cholesteatoma membrane is found on the inner wall of the antrum and the portions adjacent to the aditus. Probably in this case the epidermization was gradually extending toward the remoter spaces, and in time would doubtless have eventuated in the formation of a typical cholesteatoma. Of course it would be impossible to predict

whether this would be favorable or unfavorable to the patient's life, as the centrifugal pressure exerted by it might result in erosion of the bone in the direction of the lateral sinus or the other cranial contents; if the circumstances were favorable, and the *locus minoris resistentiae* was in the direction of the tympanum and external auditory meatus. the bone might give way, as in the instance I first quoted and the contents of the cavity find their way into the outer passage of the ear. The lining of the cavities thus exposed is sometimes as perfect as could be desired, and when freely exposed and kept dry by exposure to the air, the avoidance of the introduction of water and the use of alcoholic instillations, the patient's condition may be one of complete comfort and safety. The main postulate is that the opening should be sufficiently wide for the entrance of air and for the immediate escape of desquamative products. It need hardly be said that it is only in exceptional cases that this takes place spontaneously in the favorable direction, and as soon as the condition of cholesteatoma is recognized the surgeon should be ready to carry out the operation necessary for its free opening,

In the absence of such evidence of pressure as pain, vertigo, and bulging of the postero-superior wall of the meatus, he is justified in giving a trial to such dehydrating measures as the installation or injection of alcohol in the form of rectified spirit, which may at first be diluted to the extent of 50 per cent. This preliminary treatment is all the more called for, inasmuch as it is difficult, and perhaps impossible, to say beforehand how far the desquamating membrane extends into the mastoid cavities, and if this extension is very limited the necessity for operation may not arise. On the other hand, in the presence of pressure symptoms, no delay is permissible, and a free opening after the manner so well formulated by Stacke, is called for. If, when the opening has been made, it is found that the cholesteatomatous condition does not extend deeply into the cavities, but that they are filled with granulated tissue and broken-down bone, the hole should be thoroughly scraped out and suitable plastic arrangements for lining the cavity adopted. If the cavity is very small, any of the various well-known flaps may be formed, and

cicatrization over the granulating surface encouraged, the rapidity of healing being in proportion to the smallness of the area which has to heal. Should the cavity be fairly large, I have no hesitation in saying that it should be lined by means of a Thiersch's skin graft, according to the technique so perfectly devised by Ballance. Even in the hands of one who is only moderately expert in the technicalities of this process, the results far surpass those obtainable without it in cavities of the same size.

In those cases, however, in which the cicatricial process has extended over the whole of the walls of the cavity, I venture to believe that we have already to hand as good a lining as we can desire, and that it is not merely a justifiable but a very desirable economy of the patients's time and tissue to preserve and make the most of the lining in question. I have in several cases put this principle into practice and found a complete healing of the parts and drying up of the discharge produced with a rapidity and ease unequalled in other cases. In such cases I content myself with gently scraping out the contents of the cholesteatomatous cavity and leaving the white shiny membrane *in situ*, swabbing it carefully but thoroughly with rectified spirit. In my last case I then insufflated a quantity of sterilized aristol, a substance recommended by Mr. Ballance for use when plugging the cavity he has lined with Thiersch grafts, applying over this a light tampon of iodoform gauze, and, after about a week, starting the installation of alcoholic drops.

In cases, and there are such, in which a shiny uniform membrane is found lining the cholesteatoma cavity, I see every reason to think that this should be preserved instead of being scraped out, as is recommended by most operators up to the present. Should the membrane be pulpy, imperfect, and not homogeneous, I am equally convinced that it is our duty to practice complete erasion and to line the cavity by transplantation of a skin graft.

Discussion.

Dr. Urban Pritchard considered that the enlargement of the antrum and mastoid cells in a typical case of cholesteatoma was chiefly due to pressure and not to ulceration of the bone, as was the case in ordinary mastoid dis-

ease. This was proved by the hardness and smoothness of the bony walls of the cavity, which was lined by a thin altered mucous membrane. At the same time he agreed that there were always spots of ulceration to be found.

Dr. McBride said that according to Habermann cholesteatoma originated from ingrowing of epidermis through a perforated membrane, and that the epidermis seemed to take on an unhealthy growth. For these reasons he deemed it inadvisable to leave the matrix.

Mr. C. H. Fagge did not agree with Dr. Dundas Grant's view that the cavity was lined with a pearly membrane. He said it never was complete, and that there was always ulceration somewhere. The membrane was a thinned-out skin growing in from the surface, and persisting within the antro-attico-tympanic cavity altered by inflammation, and was different from what had been described as the matrix, which was merely the outer layers of the cholesteatomatous mass overlying the ulcerating patches. He personally did not agree with the mechanical view of erosion of bone in cholesteatoma, as it often occurred without blockage of the external orifice, as in cases of caries with large postnasal or meatal openings. He considered it to be a chronic infective ulceration, absolutely independent of pressure.

Dr. Dundas Grant, in reply, denied that in all cases of cholesteatoma there was coexistent ulceration. In complete cases the pre-existent ulceration had healed. He had not committed himself to the opinion that the dilation of the cavity might not be in part the result of infective ulceration, but he was in favor of the view that it was mainly attributable to pressure, such as was exercised by an aneurysm when it eroded the sternum, or by cholesteomata of the external auditory meatus on the bony walls of that passage. He was glad to find Professor Pritchard's views so closely coincided with his own. He looked on cholesteatoma as a "desquamative dermatitis," the stages being the formation of a derma lining the cavity, then the inflammation of this derma resulting in desquamation and the agmination of desquamative products.

LXXI.

ON THE RELATION BETWEEN THE FORMATION OF THE AURICLE OF ANTHROPOID MONKEYS, AND CERTAIN CONGENITAL MALFORMATIONS OF THE HUMAN AURICLE.

By F. Rohrer, M. D.,

DOCENT OF OTOLOGY AT THE UNIVERSITY OF ZURICH.

It is three years since I had the honor of giving in your honorable Section of Otology at Portsmouth an explanation "On the law of folding of the human auricle," derived from a large series of observations of congenital anomalies of the external ear of men. In consequence of these observations I was led to compare certain congenital malformations of the human ear with the regular and normal formation of the auricle of anthropoid monkeys. The human auricle is an organ in the state of involution and degenerative metamorphosis. As I found in my examination on the relation between the function of the eye and the ear, the auricle was primarily a homologue of the eyelid, and nothing but an organ of protection for the delicate and more superficially situated parts of the middle and internal ear. At a later degree of evolution a funnel for hearing was formed by the large development of the ear folding, especially by the upper parts of the helix and antihelix. We can see it, for example, on the representatives of the solidungula, multungula, and biscula. If we look at the auricle of a horse or of a cow, and compare it with the auricle of a monkey, we find a great difference in the direction for involution of the ear-folding by the quadrumana. When we make an inquiry as to the development of the auricle of the hemisimiæ to the simiæ, and from the simiæ to the anthropoid monkeys, we find that the evolution of the auricle is from one class to the other, from the lower to the higher. Going from the quadrumana to the homo sapiens, further, we observe a progress in the regressive metamorphosis of the external ear, and the nice and delicate form of a well-formed feminine human auricle shows that this part of the organ

of hearing is by Nature now more destined for elegance and beauty than an accoustical or a protective function. Atavism gives us the key to many puzzles of Nature. Under a great quantity of anomalies of formation of the human auricle I found a cartilaginous stripe which went from the crus helicis ascendens through the cymba in a rectangular direction to the point of bifurcation of the truncus anthelicis, and took origin on the upper side of the tragus on the incisura supratragica. This singular stripe was declared a supernumerary anthelix. A similar stripe is also found in the ear of monkeys, and Schwalbe described it under the designation of crista anthelicis anterior as a homologue to the crus anthelicis inferius.

I many cases I saw at the place of the above-mentioned stripe only a cartilaginous tubercle prominent from the crus helicis ascendens in the cymba, close by the incisura supratragica. What signifies this tubercle and the stripe from this point to the bifurcation of the truncus anthelicis? It is nothing else than the crista anthelicis anterior described by Schwalbe. A young colleague took this as the subject of his inaugural thesis. Gathering a satisfactory material for my pupil, I produced a series of drawings of auricles from anthropoid monkeys, and in all cases I found the crista anthelicis anterior more or less declined from the truncus anthelicis. The crus inferius anthelicis is really the continuation of the truncus anthelicis, and between the crus superius and inferius anthelicis is placed the fossa triangularis. Now we see that the stripe in the cymba, described as a congenital malformation of the human auricle, exists at the side of the crus inferius anthelicis and in rectangular direction to its origin from the truncus anthelicis traversing the cymba. But the crista anthelisis anterior takes its origin also from the upper part of the truncus anthelicis and traverses the cymba more or less declined. Therefore I conclude that the described stripe of the human auricle is a homologue of the crista anthelicis anterior, and that the latter cannot be the homologue of the crus inferius anthelicis.

It must be interpreted as a folding of the auricle in the direction from the basis of the auricle to the real point of the external ear to the tuberculum Darwini. The fact is most interesting, and shows how the law of involution is the same for the auricle of anthropoid monkeys and human auricle, and that in consequence of regressive metamorphosis the crista anthelicis anterior of monkeys' auricles by atavism appears a stripe in the cymba of human auricle by certain congenital malformations.

LXXII.

THE PROVISION IN LONDON FOR THE EDUCATION OF THE DEAF.

By Atwood Thorne, M. B.,

ASSISTANT SURGEON, LONDON THROAT HOSPITAL.

I was led to make an investigation into the schools for the deaf in London because, when asked by parents, both in hospital and in private, as to the best course to pursue in reference to the education of children who were either congenitally deaf or else had from disease become too deaf to benefit by attending hearing schools, I found that I was unable to give a satisfactory answer.

I had intended in this paper to refer both to public institutions and private schools and private tuition, but as the work is not uniformly good, I have found it better to confine my remarks to public institutions only.

Rather to my surprise, I found that all schools for children profess to educate by the pure oral method (that is, by teaching lip reading and articulation), and that the method of teaching the deaf and dumb alphabet and by signs is no longer used when teaching children of any intelligence. Amongst adults who have not had the opportunity of learning lip reading, and for weaklings, signs still prevail, and in one church in London the whole service is carried on in that way.

The schools which I shall refer to in this paper are: (1) The Deaf Centres of the London School Board, (2) The Association for the Oral Instruction of the Deaf and Dumb, (3) The Royal Asylum for the Deaf and Dumb Poor, (4) The Training College for Teachers of the Deaf, (5) the Paddington Home for Deaf and Dumb Children, (6) The Jews Deaf and Dumb Home, (7) the British Asylum for Deaf and Dumb Females.

The Deaf Centres of the London School Board are for the exclusive use of London children. There are eighteen of these centres dotted over the metropolis, and they are

usually close to or part of one of the Board Schools. The number of children on the roll attending these schools is 545, and the staff consists of 66 teachers.

In many cases children are not brought to the schools as early as desirable, but gradually the average age of new pupils is being lowered. What is desired is, that the deaf child should commence as early as the hearing child, and attend the whole course until he is 16. Regularity of attendance is of the utmost importance in the education of the deaf.

Great pains are taken by the School Board that all suitable cases are brought to the deaf centres. Guides are employed to bring young children from a distance, and where the education cannot otherwise be carried on the children are boarded out. These are carefully looked after by a Boarding-out Committee, each member taking charge of certain children. The pupils are, with one exception, which I will afterward refer to, taught by the "oral method," and the usual subjects of elementary education are included in the curriculum. The pupils attend the ordinary centres for wood work, cookery, and laundry work.

It will be, perhaps, convenient here to refer shortly to the method of teaching adopted, and one cannot but admire the wonderful patience of the teachers, especially in the junior classes.

When a child first comes to school, he has exercises in breathing and facial movements, so as to train the organs used in speech. He is shortly taught to imitate the teacher in making the sound of the letters "f," "th," "t," etc. This is done by carefully watching the teacher, the child being made to feel the explosive breath when these articulations are made. He also sees the part taken by the lips, tongue, teeth, etc., in forming these letters. The vowel sounds are next taught, beginning with "a" as in "father." This is often taught by placing one of the pupil's hands against the teacher's throat, the other against his own. He feels the vibration of the vocal cords, and tries to imitate it. Combinations of the sounds taught are then given—for example: "p" and "a,"="pa," "p" "a" "t"="pat." The action is then performed and the word written. Again in "t" "oo"

"th"="tooth." The object is pointed out and the word written. Thus with constant practice the child recognizes that these combinations represent a certain object or action. He also learns to write the word.

This is his first step in language—the teaching of words and their meanings. Hitherto, having never heard words spoken they had no meaning to him.

The pupil is also taught to lip-read these sounds and words, and to form sentences.

It will be seen that the progress of the deaf child is necessarily slow in the beginning, but when he has acquired a good vocabulary and some proficiency in lip-reading, his progress is much more rapid.

The only exception to the oral teaching is a class of children who have only been brought to school late in life, or who are particularly backward from other causes, and these are taught by the "combined method"—that is finger spelling, writing, etc.

Children are admitted to all the schools free of expense. Divisional superintendents of Board schools report cases in their respective districts, and Mr. B. P. Jones (15, Denmark Avenue, Wimbledon), who is the Board's superintendent and organizer of Deaf Schools, arranges for their attendance at the Deaf Centres.

The Association for Oral Instruction of the Deaf and Dumb was founded in 1871. The teaching is the pure oral and that most absolutely, and to this Association is due almost entirely the general teaching of the oral method in this country. Teachers, private pupils, and also some of the School Board class are taught here. Children from a distance are boarded out and the institution gets a grant from the Board of Education. Applications for the admission of pupils should be made to the Director, William Van Praagh, 11, Fitzroy Square, W. C.

The Royal Asylum for the Deaf and Dumb Poor has a branch in the Old Kent Road (but this is about to be disestablished) and has its main establishment at Margate. The institution dates from 1792, long before the oral method was entertained; and although the oral method is now used for 75 per cent. of the children, 25 per cent. use the silent system, and all the children at first make use of

signs to a certain extent. It is particularly interesting to see their signs for their various teachers. At the London Branch all children remain for the first three terms, they are then sent down to Margate. The children come not from London alone but from all parts of Greater Britain. The teaching of the children is on the same lines that I have mentioned before, with the important difference that the children in the asylum live all together and do not associate much with hearing people, amongst whom they will afterward have to make their living. On the other hand, the children in the asylum are well fed and well looked after, and attend school regularly. Candidates, aged 7 to 10, are elected twice a year, and all inquiries should be addressed to Mr. F. H. Madden, Secretary, 93, Cannon Street, E. C.

The Training College for Teachers of the Deaf, as its name implies, is mainly for the training of teachers, but there are also some 30 children being educated, some of them being sent from Board schools outside the London School Board area. Many of the female teachers of the London School Board are trained here, and the general teaching is therefore similar. Both this institution and the Association for Oral Instruction, already referred to, are doing excellent work in training teachers, the supply being less than the demand. At this school no boys can be kept after the age of 12, and this involves a change of teachers and environment at a rather important epoch in a boy's life.

The Paddington Home for Deaf and Dumb Children does not advertise in the usual way, but recently sent a note to the various hospitals for diseases of the ear in London, asking that deaf children might be sent to it. On going to the Home I found rather an extraordinary state of affairs. The number of children at the Home on the date of my visit was eight. On inquiring what teachers they had I was told that they had none, but that the children attended a Board Deaf Centre in the neighbourhood. On seeing the children, I found that the only person who could communicate freely with them was a maidservant, who used signs almost exclusively. All these children are taught the oral system to the exclusion of signs at the Board school, and thus their

education (if it may be called so) at the Home, is directly opposed to their education at the Board School. By living at the Home the children have the advantage of attending school regularly, but are not liable to inspection by the Boarding-out Committee.

The Jews' Deaf and Dumb School, situated at Wandsworth Common, admits all poor Jewish children over 7 years of age from any part of Great Britain, and at the time of my visit only contained thirty-eight children, all boarders. The number of children being limited, they are exceedingly well cared for, and the life is almost that of a boarding school for the upper middle classes. All the children are taught manual work of various kinds, and are thus enabled to earn their living when they leave the school. The education is by means of the oral system absolutely, and is put to a very severe test, as the children learn not only English but Hebrew in which to say their prayers, and frequently talk Yiddish to their parents. Being boarders, the children attend school regularly, and being comparatively few in number meet many hearing people. All applications for candidates should be addressed to the Honorary Secretary, Rev. I. Samuel, 74 Sutherland Avenue, Maida Vale, W.

The British Asylum for Deaf and Dumb Females has inmates from 10 to 80 years of age, and is rather for the purpose of taking care of those deaf persons who cannot earn their own living, and of teaching others how to do simple work, than of educating them, as the term is usually understood. There are, however, a few classes for the younger inmates, and here the oral system is hardly attempted. The number of inmates is about 35. All applications should be addressed to the Secretary, at 5, Bloomsbury Square, W.C.

On reviewing the subject, one finds that, speaking generally, the oral system is aimed at by all institutions; some consider the oral system applicable to all children who are deaf and not imbeciles, while others use it almost, but not quite, exclusively, and again others consider that it is only useful for about three-quarters of the children under their charge. Comparing the advantages of boarders, boarded-out children, and day scholars, one finds that boarders, except those in all schools, see little

of hearing people except their teachers; while day scholars mix with hearing people, but as a rule do not attend school regularly. Those who are boarded out with selected families have, as a rule, the best opportunity of being educated, and at the same time of mixing with the general public.

Except at the Board schools, which provide for the vast majority of London's deaf and dumb, it is as a rule impossible to keep a child at one school for the whole of its education; many of the institutions do not admit children as early as is desirable, and one turns away boys at 12 years of age.

Private schools are not all equally good, and I should advise a medical man to make himself acquainted first with the usual methods of education at a public institution, and then to inspect private schools before recommending any one in particular.

In conclusion, I beg to thank the various secretaries, superintendents, matrons, and teachers for their great kindness to me at the various institutions I have described.

Discussion.

Dr. Love thought that if Dr. Thorne's statistics were meant to represent either the extent or the results of oral teaching in Great Britain, they were misleading. As a matter of fact, there was comparatively little pure oral teaching in this country, and the oral methods often broke down in their use by deafmutes after they entered the work of life. In making this statement, he would be supported by many of the best teachers of the deaf in this country, but in case he should be put down as an opponent of the oral method, he would like to state what he considered as efficiency, and wherein he considered the present methods of teaching orally were inefficient. Efficiency, to his mind, was the ability of the deaf-mute to conduct the business of after-life amongst hearing persons without great restraint or inconvenience. Judged by this standard, the oral method often broke down, and the deaf-mute fell back on the finger method. He did not say it was the fault of the deaf-mute; he was merely stating a fact. With regard to the faults of oral teaching, the classes were too large. The ideal class was one or two

pupils to each teacher, instead of eight or ten pupils to a teacher. Given smaller classes and more teachers, he thought oral teaching could be carried out with results gratifying to parents, and satisfactory when considered with respect to the use it was put to in the after-life of the deaf-mute. Mr. Van Praagh held that all deaf-mutes could be taught orally except the idiot and the blind. He felt quite sure that this was not the case, and if his (Dr. Love's) standard of efficiency were accepted, he doubted very much whether, under even the best conditions, the majority of deaf-mutes would not fall back on the finger method in after-life.

Mr. Hunter Tod said he did not agree with Dr. Love. He had had personal evidence of the fact that oral teaching, under a proper system, could be carried out most satisfactorily. When in Berlin he had the opportunity of repeatedly visiting the deaf and dumb institute founded by Dr. Gutzmann. In this institution the children were received at the early age of 5 or 6 years. They were taught in classes of 10 to 15 in number. The deaf-mute was taught to speak by imitating the movements of the mouth and muscles of the face and neck through the sense of sight and touch, and to understand conversation by lip reading. The teaching was at first very simple, but gradually progressive, till at length—at about the age of 16 or 17—the pupil was in every way an intellectual being. As an instance of how successful this training was he mentioned the fact that the older children could converse with and understand him, although a foreigner, and therefore not pronouncing their language properly. The percentage of permanent success was very high. He thought oral teaching was in every way the best method, but the results depended largely on the teachers.

Dr. Atwood Thorne, in reply, said he had carefully refrained from advocating one or other system, but simply gave a description of what he found at each school. He had certainly met with many of the older children with whom he could talk quite comfortably, and he thought such children would continue to use the oral method after leaving school. The London School Board paid their teachers well, and never had more than eight children to one teacher.

LXXIII.

THE TREATMENT OF DEAFNESS OF MIDDLE-EAR ORIGIN.

By Chalmers Watson, M.B., F.R.C.P.E.,

EDINBURGH.

When I accepted the courteous invitation to read a paper before the members of the Otological Section, dealing with a method of treatment of deafness of middle-ear origin described by me in a recent paper, I was fully conscious that the time at my disposal was quite inadequate for a satisfactory treatment of the subject. My first duty, therefore, was to determine the line I ought to follow in order, on the one hand, to minimize the dissatisfaction that inevitably attends a restricted exposition, and on the other hand to attain the maximum result in practical utility. Three courses lay open to me. The first was to record the series of investigations which ultimately led me to think that bone marrow contained a substance which might be applied beneficially in cases of chronic ear disease. The second course was to deal with the etiology of fibroid changes in general, and in chronic aural disease in particular, so far as that might have a bearing upon the rationale of the treatment adopted. The third course was to communicate the subsequent history of some cases already recorded, and to report the measure of success which has resulted from the treatment of fresh cases.

After careful consideration I decided that the last course was the best for the purpose of the present meeting. The first course would merely show the method of induction, and would scarcely raise a presumption in favor of the conclusion arrived at. Instead of following it I take the liberty of referring members to a number of photographs exhibited in another Section, which demonstrate the effect of applying myelocene in cases of psoriasis, lupus vulgaris and senile baldness, In cases of psoriasis and

other skin lesions a good result was obtained not only by local application, but by application at a distance. I have also got a decidedly favorable reaction by the internal administration of myelocene in a case of chronic exfoliative dermatitis. These results, in my view, raise a strong presumption in favor of the theory that there is an active therapeutic agent in myelocene.

I rejected the second course with reluctance, because I think that chronic ear disease can be brought into line with other pathologic processes with which at present it is seldom or never associated, and it may be laid down almost as an axiom that without apprehending the relation of cognate diseases it is impossible to arrive at sound principles of treatment. But this course would lead to a consideration of the great problems of immunity and protection, and of the special causes which determine an infective process to manifest itself in one form of disease rather than in another.

Accordingly, I propose to submit to you the further history of a few typical cases already reported, and to record the results obtained in cases recently submitted to treatment.

The first three cases were sent to me by Dr. Haig Ferguson, and were included among the successful cases referred to in my paper. (British Medical Journal, March 22nd, 1902.)

Mrs. A. came under my care in October last with the knowledge and sanction of the aurist under whose care she had previously been. The case was a typical one of chronic non-suppurative middle-ear disease, the duration of the deafness being at least twelve years. The deafness was slowly increasing. This patient responded to treatment at once. Within twenty-four hours from the onset of treatment all the familar house sounds became "very obtrusive." In the course of a fortnight the hearing powers improved for a low conversation test from

Right ear 20″ to 25″
Left " 10′ to 17′

The improvement of a few inches for the low conversation voice test represented a marked improvement for ordinary conversation. The patient could now hear ordinary conversation at a dinner table with the worse ear,

which she had not previously been able to do. Treatment extended over three weeks, and a fortnight after its cessation she reported that she could now hear in the dress circle of the theatre nearly every word spoken on the stage, whereas two years previously when seated in that part of the house she had been unable to distinguish anything. Two months later she reported that the improvement had been maintained and objective examination confirmed this. A further course of treatment was given at this time and resulted in a further gain, but not in the same proportion as before. When last seen in the end of June the patient reported that the improvement had been fully maintained and, if anything, had increased. The net gain in this case may be summarized as follows:

Not only was the deafness prevented from getting worse, but the hearing power was materially improved, and this improvement has been maintained unabated for some months.

Mrs. B., the second of these cases, was extremely deaf. She could only hear shouting in the right ear at 18″ and left ear at 4′. Conversation had to be carried on in a much raised voice a few inches from the good ear. In the course of the last twelve years she had been under treatment by many experts without obtaining any benefit of which she was conscious. The disease was apparently progressive, as the deafness had increased in the course of the past year. The case was a typical one of advanced chronic middle-ear disease of a non-suppurative nature. The pinna was extremely hard and inflexible, and the meatus was very narrow. Treatment extended over four weeks in October and November, 1901, and effected a very marked improvement. The hearing distance increased from 18″ to 12′ in the right ear, and from 4′ to 17′ in the left. This gain enabled the patient to hear loud conversation much better than formerly, and it was accompanied by improvement in the patient's speech. She ceased to use the low, whispering tone characteristic of some very deaf subjects. This improvement was probably due to her hearing her own voice. At the same time the expression of her features was much improved and she lost a markedly nervous manner which had been growing on her and leading her to seclude herself from all

social contact. The treatment in this case was much interrupted by a blocking of the ear, due to an unabsorbed residue of the oil congealing on the membrane. This blocking occurred repeatedly, even although only three or four drops of oil were instilled into the ear, and notwithstanding the ear being syringed immediately after its application. This blocking caused an impairment of the hearing power, from which the patient recovered by careful syringing. Treatment was stopped in the beginning of November. Five months later the husband reported that there had been a gradual loss of the improvement, and that the patient was now nearly as deaf as she had been before treatment. The patient herself reported that the deterioration had been more marked in the last four or five weeks. Objective examination showed that the hearing was nearly, but not quite, as bad as ever. A second course of treatment this summer has been successful in effecting in the good ear an even greater measure of improvement than that previously obtained.

On this occasion no subjective improvement was observed until the tenth day, but in a few weeks it was very marked. Another point of interest was the entire absence on this occasion of the sensation of blocking, which had been so marked a feature of earlier treatment. A further noteworthy point is that the patient had now a persistent feeling of clearness in the ear and side of the head to a much greater degree than was observed after the first treatment. The improvement in the hearing was obvious to all the patient's friends. Here, again then we have a case where deafness had been steadily increasing, notwithstanding the use of the recognized methods, where treatment has been successful not only in preventing further loss, but in adding materially to the hearing powers. The case is instructive as to permanency of the improvement which may be gained.

Mrs. C. merits a brief record on account of her age—82. The advisability of any active treatment in a patient of such a ripe age is certainly open to question; the soundest plan is to rest content with the power spared by Nature. At the request of the patient's friends I treated her for a short time. The chances of success were minimized by finding that the case belonged to the mixed type of deafness.

The treatment extended over eight days and gave a satisfactory result. Ordinary voice—Right ear, 3′ to 15′ left ear 11′ to 17′ and the patient was aware of improvement, though not in a marked degree, but her friends reported that there was a material gain as they could carry on conversation with much greater ease than formerly. At my request Dr. Haig Ferguson visited the patient some weeks after the cessation of treatment, and he reported that there was undoubtedly a distinct improvement in the hearing power.

Reference may be made to the further history of the two cases that were fully reported in my original paper as under the critical observation of independent experts.

Miss D. had previously undergone the routine treatment in skilled hands with out appreciable benefit. A marked improvement followed the use of myelocene. Eight days after the cessation of treatment she and also her friends were aware that she had lost a little of this improvement, and on examination I found this to be the case. By this time I had formed the opinion that a complete cessation of the treatment in this case would be followed by a diminution in the hearing power, but that this loss could be regained by a subsequent course of treatment, and, at my suggestion, Dr. Logan Turner kindly undertook to observe and record the case with the view of determining the accuracy of this belief. The subsequent course justified the opinion formed. The last published record of this case was on January 26th. Contrary to my expectation in June the patient reported that the hearing power had remained as at that time, and was still considerably greater than before the original treatment in June, 1901.

Mr. E., a cycle maker, who suffering from actively progressive middle-ear disease of four years' duration was selected by Dr. McBride and myself as a man in whom the chances of the results being vitiated by a neurotic element were reduced to minimum. From the outset of treatment the improvement was marked and soon became obvious to the patient's wife and his friends, who were unaware of any treatment being carried out. Not only did the hearing power markedly improve, but the patient's mental state was bettered; he lost the feeling of persistent depression that had lately been an outcome of his auditory defects.

Little or no improvement was apparent to the low voice test. When seen in January, 1902, six months after cessation of treatment, Mr. E. stated that the improvement had been maintained. He also reported that in the course of these six months the occasional colds to which he is subject have given him only very slight inconvenience, whereas formerly a cold was accompained by a marked increase in deafness and considerable general discomfort. In July, twelve months after the treatment, the patient was conscious of some impairment and also a slight return of the sense of fullness and heaviness in the head that had been so prominent a symptom formerly, but which had been absent for nine months. The impairment was as yet very slight and had not been observed by the patient's wife. The Eustachian catheter was passed at this time. The passage was free and no improvement followed catheterization. I have little doubt that the recent increase in symptoms will disappear as a result of further treatment. From the point of view of patient and his friends this record must be regarded as highly satisfactory.

A word as to the unsuccessful cases. My original paper showed that out of 15 cases submitted to treatment, practical benefit had accrued to the patient in 60 per cent. of the cases treated. With regard to experience of later cases I must content myself with stating that a further experience has only served to confirm the favorable opinions previously formed as to the benefits obtainable in many cases.

From the foregoing records we are, I think, justified in concluding that by this treatment we can improve the hearing in many cases of chronic non-suppurative middle-ear disease to an extent considerably above that attainable by present methods.

A question will naturally arise as to the class of cases in which some improvement may be looked for from the treatment recommended. My experience on this may be summarized.

1. Cases in which the pathologic process had apparently been arrested, as evidenced by no further deterioration in the hearing power having occurred for a few years previously have given little or no result.

2. The existence of internal ear disease does not contraindicate treatment being tried, as I have found a marked in 3 out of 7 cases submitted to treatment. In 2 of these cases the patient did not hear the tuning fork when placed over the mastoid, but, as a result of treatment, the same tuning fork became clearly audible. In cases with internal ear complications extra care must be taken in the application of any mechanical stimulation to the middle-ear.

3. Any case that is not improved by the local application of myelocene alone, and where the hearing is made worse by even a small amount of mechanical stimulation is unsuitable for this treatment.

The Evidence as to the Improvement in the Hearing Power.

Some reference should be made to the evidence of improvement in the hearing power. As we are dealing with incurable disease, all treatment is directed to the relief of its leading symptoms, and as these are so largely subjective we must rely mainly on the subjective experiences of the patient. In general we may take it that the possessor of the organ of hearing is the best judge of how that organ is fulfilling its function. In this we adopt the same test as in the case of stomachic, cardiac, or other similar disease. In the case of the ear we have of course a valuable means of corroboration in the voice test. In my experience, however, these tests differ greatly in value. Thus I have found the whisper test or a very low voice test give quite unreliable results as to a patient's hearing power for practical purposes. A pertinent illustration may be given in the case of a patient, aged 42, recently sent to me by Dr. Paterson, Leith. Like the other cases this subject had previously been treated by experts on the recognized lines, but without benefit of which he was conscious. In this instance a distinct improvement was apparent to all the patient's friends, and the patient himself was able for the first time to use the telephone, yet my record shows no decided improvement for the low voice test. To my mind convincing evidence against the reliability of certain voice tests is to be found

in the records of two independent experts in my original paper. I would more particularly refer to the record of figures there made by Dr. Logan Turner, who found in a patient on

October 9th.	Whisper test, R. 4″, l. 6″;	ordinary voice, R. 60″, l. 96″
January 26th.	" R. 6″, l. 8″;	" R. 17″, l. 36″.

The patient and her friends were conscious that the hearing power for practical purposes had undergone a great deterioration between the two dates. The figures of the latter date for the whisper test fail to disclose this deterioration, but would actually indicate a slight improvement.

TECHNIQUE.

The method of treatment as originally described was as follows: It consisted in instilling into the ear half a drachm of equal parts of warm rectified spirits and glycerin, and applying the same quantity to the skin of and around the ear. This was accompanied by massage of and around the ear and various movements, mainly those of intermittent pressure over the external meatus continued for some minutes to each ear. The excess of fluid was then removed. Then followed a similar application of myelocene, 5 to 10 drops of the warm clear oil being dropped into the ear with a pipette previously warmed by passing through a flame; and about 10 to 20 drops were rubbed on outside the ear. This operation occupied about ten minutes for each ear. During the treatment the head was laid flat, jaw movements were employed on account of a supposed favorable influence on the middle-ear circulation, and the hearing was exercised repeatedly. In most cases this treatment was carried out daily, and in some on alternate days only. The Eustachian catheter was employed from time to time. In some cases it was found that distinct benefit followed the use of the catheter, although previously its use had effected no improvement. It was found that the absorbent properties of the ear structures varied considerably. Sometimes the oil was not absorbed, and the residue solidified on the membrane, and interfered mechanically with the hearing power. Since the publication of my paper I have been employing various modifications of this treatment.

(*a*) Instead of using the preliminary stimulation with

rectified spirits and glycerine, I have rather relied upon the heat of the oil and the mechanical stimulation by movements to provide the necessary vascular reaction. This method is a saving in time, and so far seems to me to be equally successful.

(*b*) Various mechanical appliances have been tried as a substitute for the digital manipulations—namely, the special apparatus for vibratory aural massage familiar to experts in the Swedish system of massage and also the use of a vibratory apparatus similar to that known as the vibratorium method.

(*c*) A trial has also been made of pneumatic massage of the membrane and middle-ear structures, conducted simultaneously in the outer ear and in the middle ear through the Eustachian tube, after the method which I learned from a Swiss physician, Dr. Mermod.

I believe that these forms of mechanical stimulation, judiciously used, are important factors in treatment.

Principles of Treatment.

The principles of treatment in this affection are:

1. The promotion and maintenance of a more vigorous circulation in the middle-ear with the view of (*a*) increasing the resisting powers of the tissues, and (*b*) promoting the absorption of morbid products where possible. I believe that not enough is attempted in the way of judicious stimulation of the middle-ear structures. The present practice appears to me to be too much restricted to momentary stimulation effected by the use of Politzer's bag or the catheter.

2. The maintenance of thorough aeration of the nasopharynx and middle-ear. This acts favorably, not only through its influence on the tension of air in the tympanum, but also by its action in maintaining a healthy state of the circulation in the middle-ear and of the secretory glands in the mucous membrane of the nasopharynx.

3. The restoration of a greater degree of flexibility to the tympanic membrane and associated structures. The normal tympanic membrane contains fatty constituents to an extent that interferes considerably with its staining properties on histologic examination, and in the disease

under consideration this property largely disappears. It is reasonable to think that an oil which is an internal animal secretion would possess greater value than other oils, and this is borne out by my own experience.

What that value is and how the oil acts must be determined by the methods of clinical, chemical, and physiologic investigation. I have laid before you the evidence from which I conclude that myelocene is clinically useful. From chemical analysis of active and inactive extracts of bone marrow no results have been obtained. The method of physiologic investigations remains. For this method the important facts contained in the above record are as follows:

1. The application of myelocene is not necessarily local, although it may have a special action locally. It acts at a distance after inunction and by absorption through the alimentary canal.

2. In the diseases referred to the changes are largely those of a fibroid nature.

3. The substance is found in the bone marrow, which is the seat of formation of the white corpuscles and other cellular constituents of the blood.

It would therefore appear probable that this substance acts in one or both of the following ways:

(*a*) By an increased vascular activity, more especially of the capillaries.

(*b*) Specifically, in virtue of an enzyme or other active principle found in the bone marrow.

The chemical analysis of myelocene referred to in my paper was conducted by J. F. Macfarlane and Co., manufacturing chemists, Edinburgh, under my own direction, and that firm is now able to supply a preparation of the substance.

Discussion.

Dr. Love had kindly been supplied by Dr. Chalmers Watson with some of this preparation, and had used it as carefully as he could. In one or two of his cases—he had treated five or six altogether—temporary improvement had not been maintained. The temporary improvement he attributed to the stimulating effect on the local circulation, and to the mechanical effect of the oil when in a liquid state in assisting in the conduction of aerial sound

waves. Dr. Love regretted greatly not to be able to state that the improvement had been permanent, for the class of cases which myelocene attempted to deal with were amongst the most hopeless coming under the notice of the aural surgeon.

Mr. Lake said that when he was younger and more hopeful of improving this class of case he tried a novel intratympanic injection; the result was excellent, but the duration of the improvement short and relapse certain. He alluded to the ancient custom of painting the membrana tympani with $AgNO_3$, and suggested that a like irritation might be obtained by the method under discussion.

Dr. Pinder stated that he had to some extent tried myelocene in a number of cases, but without an encouraging result. That, however, in fairness it should be stated that the directions laid down by Dr. Watson had not been fully carried out. In his article in the British Medical Journal he recommended instillation of spirit and glycerine, to be followed by the myelocene. He had used the latter alone. Further, as no standard preparation of the myelocene was at that time obtainable from any chemist, it was quite possible that the substitute, though prepared in accordance with the formula given, might prove more or less inert.

Dr. Jobson Horne asked for information about the composition and specific virtue of "myelocene," and for what particular form of middle-ear deafness it was remedial. The results obtained from its use by Dr. Chalmers Watson did not convince Dr. Horne of its efficacy, and in the hands of others the effects produced appeared to have been of only a transient character. Dr. Horne was therefore disposed to accept the views put forward by previous speakers that the effects produced were due to a local stimulation of the circulation of the middle-ear. Personally he had had no experience with "myelocene," and could not criticize it. One was naturally slow to accept a new preparation as a remedy for a disease which had long baffled treatment, more particularly whilst the remedy was still in the stage of empiricism. At one time the "sheep's wool treatment" of deafness was in vogue, that was many years ago; one speaker had said 250 years

ago, and that the virtue of the treatment depended upon the wool used being the curly lock upon the forehead of a black sheep. Pliny also spoke of the therapeutic value of sheep's wool. Dr. Horne thought it was just possible that ultimately it might be shown that all these remedies for intractable middle-ear deafness possessed the same active property.

Mr. Mayo Collier said they were all ready and anxious to welcome any improvement in the treatment of chronic middle-ear disease and more especially from Dr. Chalmers Watson, who had frankly and fully laid his views before the meeting. It would be quite unwise to jump to any conclusions on the small number of cases yet treated. He felt sure they were all prepared to hold an open mind on the question and give the suggestion a fair trial. Mr. Collier would not prophesy, but he feared this remedy, like so many others that had been extolled as sovereign cures, would be doomed to disappointment. Most of the injections into the tympanum acted as stimulants and acted also mechanically, inducing movements of the parts and an increased rate of lymph and blood flow so, as it were, rousing the parts into temporary activity.

The President said that in a few cases he had made use of the line of treatment advocated by Dr. Chalmers Watson. His idea was that the collateral treatment used at the same time had a great deal to do with the slight improvement obtained. The fact, also, that even the usual cases of middle-ear catarrh varied from time to time, and the fact that fostering a hope that improvement might result, were factors not to be lightly dismissed in estimating the value of any particular line of treatment. He hoped that Dr. Chalmers Watson would prosecute his inquiry, and report his results later on.

Dr. Chalmers Watson, in reply, drew attention to the diversity of of the results obtained by the different speakers. On the one hand, Dr. Love by the use of a reliable preparation, had found temporary improvement in a series of 4 cases; and on the other, Dr. Pinder and the President had found that no benefit followed the use of a preparation prepared by themselves, and tried by Dr. Pinder in a large series of 30 or 40 cases. These results were extremely interesting, and confirmed the speaker's observations as to different qualities of bone marrow. The good results obtained by the author in the favorable cases recorded had not been of the transient nature which Dr. Love had experienced, and his own experience led him to give a very favorable opinion on all cases that gave temporary improvement, to which Dr. Love had referred.

LXXIV.

REMARKS ON THE ANATOMY OF THE TEMPORAL BONE, WITH LANTERN ILLUSTRATIONS.

DR. R. C. ELSWORTH,

SWANSEA.

Dr. Elsworth showed a carefully selected and interesting series of anatomic specimens of temporal bones, and illustrated many of them by means of the lantern. The main point in his demonstration was to point out the existence of an almost constant cell or cavity which lay behind the antrum and was situated in close juxtaposition to the anterior extremity of the transverse sinus, just as it began to form the sigmoid. From this cavity a vein proceeded and ended in the sigmoid sinus. Dr Elsworth wanted to dignify this cavity with the name of "accessory antrum" in order to aid descriptive anatomy.

Dr. Love thought the meeting was indebted to the demonstrator for the exhibition of slides which had just been given. But he regarded with much trepidation the addition of anything like an "accessory antrum" to the already complicated terminology of the anatomy of the temporal bone. It seemed to him that the so-called "accessory antrum" was nothing more than the upper set of mastoid cells, and was in much more direct communication with the mastoid cells proper than with the mastoid antrum. Its existence and description as the upper set of cells was quite clearly given in textbooks on the anatomy of the temporal bone, namely, Broca's, recently rendered into English by Mr. McLeod Yearsley.

Dr. Jobson Horne pointed out how important it was in the operative treatment of disease of the antrum to be aware of these aberrant cells. The addition of terms to the nomenclature of the anatomy of the temporal bone he hoped would be kept as far as possible under control, more particular in the use of the term "mastoid." The term "accessory antrum" as suggested by Dr. Elsworth, he thought was more applicable to the cell he had described than that of "aberrant mastoid cell." The vein Dr. Elsworth had met with in the accessory antrum, and had found passing into the sigmoid sinus, Dr. Horne took to be the petrosquamosal sinus, which Mr. Arthur Cheatle had carefully investigated. Its importance as a pathologic factor, especially in early life, was probably not sufficiently appreciated.

LXXV.

APPARATUS FOR INTRATYMPANIC HOT-AIR TREATMENT OF CERTAIN FORMS OF CATARRH OF THE MIDDLE EAR.

By Dr. Adolph Bronner,

BRADFORD.

He showed an apparatus for the intratympanic hot-air treatment of catarrh of the middle-ear. It consisted of a metal air-tight cylinder, lined with asbestos, which fitted over a Prometheus heating oven. The heat was generated by the electric current passing through specially-prepared thin mica sheets. It could be regulated by a patent three-contact system, by means of which four degrees of temperature could be obtained. The cylinder was connected with a large hand pump, or with an American air receiver, by means of which a constant and regular current of air could be produced for any length of time. The hot-air was blown through an ordinary Eustachian catheter into the middle-ear. The air should be applied for a lengthened period of time, one-half to five minutes, according to the nature of the case.

Dr. Bronner was using the apparatus for cases in which the mucous membrane of the Eustachian tube and middle-ear were affected, and in cases of so-called dry catarrh. In some chronic cases of tinnitus the results were excellent. Also in cases of recurrent catarrh of the middle-ear. Dr. Bronner hoped to improve the apparatus still further, and at some future meeting to bring forward statistics of cases treated by this method.

Dr. Pinder corroborated Dr. Bronner's remarks as to the value of the application of heat in ear disease, and had found it valuable externally as well as internally. In catarrhal deafness he had been accustomed to recommend, with advantage in some cases, an application of heat somewhat on the lines of the Tallerman treatment, such as the placing of the arm on the affected side in the open oven, resting the limb upon a wooden box and cushion for twenty minutes or half an hour at a sitting.

ABSTRACTS FROM CURRENT OTOLOGIC, RHINOLOGIC AND LARYNGOLOGIC LITERATURE.

I.—EAR.

The Indications for the Radical Mastoid Operation, with a Description of Its Technique.

W. SCOTT RENNER, Buffalo, N. Y. (*Buffalo Medical Journal*, June, 1902.) The various conditions which demand the performance of the radical mastoid are discussed somewhat in detail, special consideration being given to true and false cholesteatoma. The latter condition is more truly an otitis media desquamatosa, and is to be differentiated from the true cholesteatoma, which is a tumor surrounded by a fibrous membrane, and connected with the periosteum of the cavity in which it lies, of smooth surface, and formed of onion-like lamellae of polygonal, epidermoidal cells, between which are often found cholesterin crystals in varying quantities.

The point is made (which the reviewer has often noticed), that in many of these cases the sigmoid sinus lies far forward and may be only two millimeters from the posterior wall of the external auditory canal. When this is the case, the regular Stacke operation must be performed.

The plastic of Stacke is preferred, a flap being made of the posterior cutaneous wall by separating it from the auricle by an incision at the point where it is attached, and making a second incision at right angles to this along the posterior superior border of the canal. This flap is laid in the inferior portion of the bony cavity, and the dressings hold it in position. *Richards.*

The Early Diagnosis and Treatment of Acute Mastoid Inflammation.

T. H. HALSTEAD, Syracuse, N. Y. (*Philadelphia Medical Journal*, August 2, 1902.) Where the diagnosis is in doubt, pain, increased temperature and the result of pressure are important symptoms. Deep pressure with the

finger over the antrum and tip of the mastoid should be made on each side. The pain may be referred to the whole side of the head. The classical symptoms of heat, swelling and redness over the mastoid are late signs of mastoid inflammation, and the diagnosis ought to be made earlier than these manifest themselves, and before the bone is so extensively broken down.

Examination of the pus discharge is important, both as to diagnosis and prognosis, as streptococcus infection is more severe and destructive than infection due to the presence of staphylococci or pneumococci.

At the first sign of acute inflammation of the mastoid the patient should be put to bed, given a brisk purge, and a free incision made in the posterior inferior quadrant of the drum, extending to the attic should there be any bulging there. If this is done, most cases of acute mastoid inflammation will begin to subside. If subsidence does not promptly occur, or if this treatment be applied too late, operation will be required.

The goal of the operation is to reach the antrum, and in early cases antral drainage may be sufficient, "but ordinarily there has been quite a destruction of the bone, and all the soft bone, granulation tissue, etc., should be removed, and this will often mean the removal of the whole cortex and all mastoid cells extending down to the tip." *Richards.*

Ablation of Both Mastoids for Chronic Suppurative Inflammation of the Middle Ear,

E. E. HOLT, Portland, Me. (*Journal of Med. and Science*, May, 1902.) The case was followed by extreme variations in the temperature of the different parts of the body at the same time and of the whole body at different times, of more than twenty degrees Fahrenheit. There existed extreme high temperature in the mouth (114° + F., 45.5° + C.) with extreme low temperature in the rectum (94° — F., 34.4° — C), then changing to low temperature in the mouth with extreme high temperature in the rectum, again changing to extreme high temperature in both the mouth and rectum, to be followed by extreme low temperature in both the mouth and rectum, the extremes of temperature not being measured by any available thermometers that registered more than 94°F. to 114° F., and four thermometers

were broken by the intense heat. Later amblyopia developed in both eyes. Complete recovery.

Operation was done for chronic suppuration in the left mastoid on February 1, 1901; in the right mastoid in April, 1901; the cells being found extensively diseased in in each instance. The patient was dismissed free from discharge with good hearing in both ears. Six months later she again came to the hospital on account of a clear gelatinous discharge from the right ear containing staphylococci, and the tympanum was curetted on Nov. 18th. On Dec. 18th, temperature was 102.6; on the 21st, 104, without chills, giddiness, nausea or vomiting, but with ill-defined pain on the right side of the head and with no special point of tenderness. On this side the ossicles were removed, the tympanum curetted and the lateral sinus opened; this latter appeared normal. On January 10th, it was 101 in the morning and 108 at 10:15 p. m.; pulse 86. On Jan. 11th it was 97.4 in the A. M.; pulse 116; and on this day the lateral sinus was opened again, and the temporo-sphenoidal lobe of the brain explored. There was evidence of considerable pressure, and the dura markedly pulsated. The temperature was about normal for the next 15 days, the pulse ranging from 80 to 100. Jan. 26th, the temperature ranged from 98.6 to 108, and from this date to Feb. 11th, the temperature varied from 97 to 114, being frequently 111, and on 27 occasions went as high as 114 or higher, with a pulse of from 80 to 96, the temperature being taken nearly every two hours. There was no uniformity between the temperature in the mouth and the temperature in the rectum, there being frequently a difference of from 3 to 6 degrees, sometimes one, sometimes the other being the highest. On Feb. 12th, temperature went to 94, and was subnormal most of the time for 3 days, when the patient left the hospital. Recovery was complete. Patient was not so sick as would be expected in one whose temperature was so profoundly disturbed. The author thinks that there was some profound disturbance of the heat controlling centers, but is unable to explain it.

Richards.

Indications for the Mastoid Operation.

PHILIP HAMMOND, Boston (*American Medicine*, April 12, 1902), thinks that many cases of threatened mas-

toiditis can be aborted by free incision in the drum membrane, followed by hot douching every two hours; but warns against being misled by the diminution or absolute cessation of the discharge, as this does not necessarily mean that the patient is becoming better; since there is a natural tendency on the part of the drum to close over, and this must be prevented. The fact that there may be no accompanying increase in temperature has no significance, as the mastoid may be involved very extensively without any increase in temperature. While regarding tenderness of the bone as an important symptom, it may be absent and the mastoid still be filled with pus. He does not think that primary mastoiditis occurs, but that it is always subsequent to purulent involvement of the middle ear. *Richards.*

The Treatment of Thrombosis of the Lateral Sinus Following Middle-Ear Suppuration.

EDW. B. DENCH, New York (*American Journal of the Medical Sciences.*, May, 1902), has operated upon 22 cases of sinus thrombosis. Of these, two have died, one of septic pneumonia, and the other of acute nephritis apparently induced by the administration of ether. The internal jugular was ligated in four cases only, and all of these recovered. It is his practice in every mastoid operation to remove thoroughly all evidences of carious bone and to follow the softened bone to the dura in every direction if this be necessary for the complete eradication of the infected area. Unless the lateral sinus appears perfectly healthy on palpation, it is his practice to incise the sinus wall for exploratory purposes. He formerly did this with the exploring needle, but found that in some instances fluid blood was withdrawn even where infection of the sinus had taken place; so that he now incises the wall sufficiently to make sure of the condition of the blood sinus. Before doing this, however, the mastoid antrum area is entirely packed off by means of iodoform gauze, and the entire field of operation is thoroughly cleansed, and all instruments carefully resterilized before this incision is made, the sinus being exposed by removing the bony covering of the sigmoid groove for at least three-quarters of an inch. The incision is made about the middle of the area of sinus exposure. "If there is a clot in the sinus at this point,

there will either be no hemorrhage at all or a very slight hemorrhage from below. A curette is then passed into the lumen of the sinus, and the clot removed, so that free bleeding is established from below. Pressure is now applied at the point of incision in the sinus, and the pressure above is removed. If free hemorrhage does not occur from the direction of the torcular, a curette is introduced in this direction, and the lumen of the vessel thoroughly curetted until free hemorrhage is established, it being imperative that free hemorrhage be established from the upper end of the sinus, excepting in those cases where the lumen of the vessel is occluded by a firm fibrinous clot which has evidently been in position for a long time and has become thoroughly organized. Where such a condition is found, and where the lumen of the vessel seems to be obliterated and the entire vessel has been converted into a mass of connective tissue, it is then unwise to attempt to break down this firm plug in the upper portion of the sinus. Naturally if the clot has become firmly organized no further infection can result from it. Where free hemorrhage is established both from the upper and lower angles of the sinus wound, or where the upper portion of the vessel seems to be firmly occluded by an organized clot and there is moderate bleeding from the lower angle of the wound, I do not deem it advisable to institute a more radical procedure at the time of the primary operation. Hemorrhage should be controlled by firmly packing the sinus wound by means of iodoform gauze, and shutting off the sinus area from the middle ear and adjacent mastoid cells by means of a firm packing of iodoform gauze. Such a dressing will remain in position for from four to six days, and there is no indication for its removal unless there is a sudden rise of temperature to 103 or 104 F."

No unfavorable issue follows the exploration as an operation by itself. If, however, the temperature after one to three days shows any indication of systemic infection, he incises the internal jugular by exposing its entire length by means of an incision from the sternal attachment of the sternomastoid muscle to the tip of the mastoid process. The vessel is dissected from its sheath low down in the neck, surrounded by two ligatures, and

divided between them. The distal end is then clamped with an artery clamp, raised by an assistant, and rapidly dissected upward until the common trunk of the temporal and facial is reached. This trunk is surrounded by two ligatures and divided between them. If the thyroid veins are large they are treated in the same way and any other veins which appear large enough to occasion free hemorrhage. In this way the entire trunk of the jugular is dissected out from just above the clavicle to just below the base of the skull, where two ligatures are again thrown around the trunk of the vein and the vessel divided between them. "The lateral sinus having been freed of all infectious material from above, and the jugular trunk having been removed in its entirety from below, there only remains a small portion of the sinus occupying the jugular fossa, and commonly known as the jugular bulb, which can be a source of infection. Simple cleansing by means of irrigation through the sinus wound will effectually free the jugular bulb from any infectious material."

Some illustrative cases are then reported. The author believes that in all doubtful cases the internal jugular should be removed, but does not advise that in *every* instance of sinus thrombosis that this be done. He considers that where the patient has been under observation for a few days, with a fairly complete temperture record of from 24 to 48 hours, with no marked evidences of systemic infection, the surgeon may rely upon simple clearing out the clot in the sinus if this be found; but in those cases which are first seen at the time of operation and in which the sinus cannot be properly cleared, and in which also the surgeon is confident that a certain amount of infected material is left in this venous channel, immediate incision of the internal jugular is demanded. The temperature chart is the only sure guide. Tenderness in the neck may be present or it may be absent. A remittent temperature which is gradually becoming higher and higher, with a certain knowledge that the lateral sinus is already invaded, should be followed by excision of the internal jugular. *Richards.*

Sinus Thrombosis Depending on Middle-Ear Disease, with Report of a Case Following Acute Sore Throat.

GEO. F. COTT, Buffalo. (*American Medicine*, April 19,

1902). The case reported is that of a young man of 18 who had a running ear when three years old, measles at eight and was subject to tonsillitis. Following a sore throat he had earache and a watery discharge with rise of temperature followed by chills. On admittance to the hospital temperature was 102. On opening the mastoid no pus was found, but the bone was soft and there was granulation tissue in the antrum. No improvement followed the operation; on the contrary there was high temperature, chills, perspiration, constipation, but no loss of consciousness. The retinal vessels increased in prominence in the right eye. The day following there was tenderness and a cordlike feeling along the course of the internal jugular vein on the left side with a temperature of 105. The next day the temperature was 106.4; pulse, 118. Internal jugular was opened quite low down, found empty, and three-quarters of an inch of it removed. The sinus was then opened for one-half inch, and a thrombosis found, exposed and three-fourths of it removed, when free bleeding taking place the rest was rapidly removed and iodoform gauze packed into the wound.

Patient slowly recovered, recovery being complete, but there was considerable pyemia for some time, the temperature only gradually dropping to normal. The author thinks this was a case of thrombosis following an osteophlebitis, which in its turn was caused by some infection from the throat. *Richards.*

The Exenteration of the Cavum Tympanum for Acoustic Purposes.

G. GRADENIGO (*Arch. fur Ohrenh*, Bd. 54 and 55), states that 3 classes of cases give indication to operation for the purpose of bettering the hearing; (1) the chronic, dry, sclerosising catarrh; (2) remains after otitis media; (3) those cases which according to the anamnesis arise from an otitis media acuta but which objectively resemble a dry catarrh. The indications for operation are rendered more difficult by our incomplete methods of testing. In the operation, everything depends on preventing a great reaction. This happens especially in these of the 2nd class. Syringing must be relinquished. Blood clots must be carefully removed since they furnish a favorable cul-

ture medium for the pus germs; 9 carefully observed cases illustrating the above, show, however, how doubtful the prognosis of operative interference is. The author's conclusions are: (1) The results of the operation are the better, the less the internal ear is affected. (2) In the sequelae of otitis media suppurativa with partial destruction of the drum, especially the cases which present the picture of a catarrhal otitis with an anamnetic suppuration. (3) Less favorable results in chronic, dry catarrh; still better in sclerosis. (4) The post operative treatment is important. *Levy.*

Diplacusis Monauralis.

E. BERTHOLD. (*Archiv fur Ohrenheilk.*, Bd. 55.) A very musical man suffered, in the course of an otitis media acuta, with disturbances in the perception of tones in the diseased ear. In addition to the correct tone he heard another, which differentiated itself above or below, according to the position of the tone near the third or fifth. The phenomenon disappeared with the healing of the process. The author believes the middle-ear to be excluded as the seat of the disturbance, and thinks that there was an exudative clouding of the labyrinthine fluid or swelling of the basal membrane, caused by the middle ear process, which causes a disturbance in the fibres of corti. In this way, the sounding of any tone would excite not only the corresponding fibre, but at the same time one of the neighboring ones, and cause its specific tone sensation to be carried to the brain. *Levy.*

The Use of Local Anesthetics in Operations on the Drum and Meatus.

HAUG (*Archiv fur Ohrenheilk.*, Bd. 55) discusses the numerous cocain solutions in use and comes to the conclusion that all of them have insufficient action. Orthoform as a powder has the best effect upon the pain in an open middle ear, and often on the pain of a furuncle which was insufficiently opened. Chlorethyl ether, and Schleich's infiltration are not to be used in the ear. *Levy.*

The Mechanism of the Growth of Cholesteatomata.

A. EPHRAIM (*Archiv fur Ohrenheilk.*, Bd. 54) observed a case of cholesteatoma of the mastoid in which in spite of a broad opening and evacuation, and even after complete epidermization of the cavity, new cholesteato-

mata continually arose. After removal of the later, a red surface was visible; a remarkable circumstance was the gradual enlargement of the cavity. Since a pressure influence is excluded in this case, the author concludes that cholesteatomata wear the surrounding bony wall away not by pressure but by direct action. *Levy.*

Neurosis and Mastoid Operations.

STENGER *(Arch. fur Ohrenheilkunde,* Bd. 54), reports 10 cases of operation for purulent mastoiditis where the complicating nervous affection was decidedly bettered thereby. These were 2 epilepsy, 1 chorea minor, 1 hysteroepilepsy, 4 hysteria, 1 menstrual disorder and 1 multiple sclerosis. The author regards an etiologic relation between the ear suppuration and the nervous disease as excluded. He explains the result rather by the operative shock, (2) hemorrhage, (3) the energetic drainage of the cranial cavity during the post operative treatment by absorbing dressing, i. e. by removal of the blood from the diseased parts. He recommends therefore in similar cases that the cranial cavity be opened in operation on the ear. *Levy.*

Thrombosis of the Bulbus Venae Jugularis.

STENGER *(Arch. für Ohrenh.* Bd. 54) has examined a number of temporal bones, under the direction of Trautman, in regard to the variable position of the bulbus venae jugularis. In many cases the sinus sigmoideus curved into the vena jugularis without forming a bulbus. In other cases the bulbus lay higher than the deepest point of the sinus. When the bulbus was better developed, it reached the highest point of the pyramid and touched the cranial cavity with its thin walls, which were dehiscent in the neighborhood of the aqueductus vestibuli. The less developed bulbus was separated from the middle ear by a wall $^3/_4$-$^1/_2$ mm. thick. The better developed it was, the further it extended toward the medial wall of the middle ear, even above the oval window. The more extended the sinus was, the less developed was the bulbus, and the more prominent the sinus was, the better developed the recessus jugularis. This is principally because the waves of the blood in this case did not empty directly into the sinus, but spent their energy partially on the superior wall of the bulbus, and gradually hollowed this

out more and more. In this way cochlea and semicircular canals were to a certain extent pushed forward. A highly developed sinus is predisposed to thrombosis, partially on account of the vicinity of the middle ear, on account of the possibilities of the formation of eddies and stasis. There can easily be complete thrombosis. The bulbus must be laid bare by operation. *Levy.*

A Case of Cerebellar Abscess After Injection Through the Labyrinth—Death from Meningitis—Autopsy.

ARNOLD KNAPP. (*Archives of Otology*, XXXI, No. 2.) A man, aged 26, with left sided purulent otitis media of many years standing, became acutely ill, and suffered from severe headache and vertigo. The canal was stenosed and filled by a granulating mass projecting from above and posteriorly. No mastoid tenderness. Temperature 102.4° F. Pulse 110. Eyes normal.

On operation, a very much enlarged antrum filled by cholesteatoma was found. The posterior bony wall of the auditory wall is defective and filled with granulations. On their removal the facial nerve was exposed, and a large defect found in the anterior half of the external semicircular canal. The tympanum contains granulations but no ossicles. The oval window is enlarged and discolored granulations are seen in the vestibule. The external semicircular canal was removed and free communication with the vestibule established. The patient appeared to do well, and was allowed to leave the hospital, but about one month later, he suddenly became worse, had very severe headache, nausea, slight left facial paralysis and nystagmus on looking to the affected side. Temperature 101.4°. Pulse, 108.

The wound was re-opened and all granulations removed. Back of the facial nerve a wedge of bone covering the cerebellar dura was removed. A probe passed in various directions revealed nothing abnormal. The oval window was enlarged and promontory wall removed. The vestibule contained greenish granulations. The tegmen tympani was removed but dura was there healthy.

Six days later the patient's condition was decidedly worse, pulse rate dropped to 80. Then the posterior surface of the petrous bone was removed, and a healthy sinus exposed with the object of getting as near to the in-

ternal auditory meatus as possible; the semicircular canals and cochlea were removed. The cerebellar dura was incised horizontally, and the cerebellum punctured in various directions; congested meninges but no free pus found.

On autopsy, purulent meningitis of convexity and at base. The apex of left lobe of cerebellum adherent to dura on the posterior petrous surface at the risk of the internal auditory meatus. The pons, crura cerebri and 4th ventricle are bathed in pus. In the left cerebellar lobe in the region of the flocculus there is a small abscess cavity, 2x1$^1/_2$ cm., which seems to have communicated with or ruptured into the 4th ventricle. *Campbell.*

On the Value of Electrolysis in the Eustachian Tube.

PIERCE, Chicago. (*Archives of Otology*, Vol. XXXI, No. 4.) In a review of twenty cases the author came to the following conclusions:

1. In otosclerotic disease, electroloysis is useless.
2. In the great majority of cases of catarrhal disease, it has no advantages over other methods of treatment.
3. In a certain few cases where there is probably a soft exudate near the isthmus, it may be regarded as of some value. *Campbell.*

The Involvement of the Gasserian Ganglion in Middle-Ear Suppuration.

HILGERMANN, Breslau. (*Archives of Otology*, Vol. XXXI. No. 4.) A well-known path of infection is one leading through the pneumatic spaces of the petrous bone. These pneumatic spaces, which in general are only found in the mastoid, may present an unusual development and may even occupy the entire pyramid.

Urbantschitsch described a case where fluid injected into a defect in the tympanic wall would appear in the cranial cavity at the apex of the pyramid.

The otitis media may lead to a phlebitis of the smaller blood-vessels, which pass from the tympanum through the cortico-tympanic canaliculi to the venous plexus surrounding the carotid.

The author cites cases where infection was carried by those paths. *Campbell.*

Toxemia from Suppuration in the Temporal Bone.

H. EULENSTEIN, Frankfort on Main. (*Archives of Otology*, Vol. XXXI, No. 2.) To eight similar cases recorded

the author adds another. A child, aged 11, the previous year had suffered from typhoid. On coming under observation there was fever, pain in the neck and purulent discharge from the right ear. Membrane appeared on tonsils next day and antitoxin was employed. Five days later tonsils clean, temperature 40.1° C. Mastoid pain, profuse ear discharge. A measles-like rash appeared and as it faded away the temperature fell to almost normal.

Mastoid tenderness increased and temperature again rose. The mastoid was opened and found full of pus and granulations. The sinus was exposed for a distance of $^3/_4$ cm. For two days subsequent to operation patient's eondition was very satisfactory, pulse and temperature then rose. Sudden collapse and death.

Autopsy showed swelling of the spleen, edema of the lungs, a little serous infiltration of the brain and a small area of nodular infiltration in the wall of the lateral sinus.

Campbell.

Does Early Treatment of Acute Inflammation of the Middle-Ear Prevent the More Serious Complications?

MEIERHOF, New York. (*Archives of Otology*. Vol. XXXI., No. 1.) The author cites four cases as types of different classes of acute disease.

Free early incision of the Mt. relieves pain, and n children should be followed by a fall of temperature. Incision should anticipate rupture, and thus have drainage where it will be least interfered with. In a few cases owing to anatomic peculiarities and other conditions, in spite of our efforts, they will grow worse, and nothing short of complete exposure of the mastoid will suffice. *Campbell.*

The In erior Occipital Plate of the Mastoid with Special Reference to Bezold's Mastoiditis.

JOHN DUNN, Richmond, Va. (*Archives of Otology*, Vol. XXXI., No. 2.) By inferior occipital plate of the mastoid is meant that part of the temporal bone which lies internal to the digastric groove, its posterior boundary being a line at right angle to the posterior end of this groove.

The plate is from one-sixth to one-fourth inch wide, and has a portion of the sigmoid sinus just above its inner table.

In a very considerable portion of cases the inferior occipital plate contains air cells connecting with those in the

mastoid process. It is highly probable that purulent osteitis of this occipital plate with its air cells exists in the severer forms of Bezold's mastoiditis, and that the rupture takes place through its inferior, i. e., outer, table, and pus thus reaches the deepest structures of the neck.

This anatomic description of cells serves to explain why some operations for Bezold's mastoiditis fail, even though the entire tip and the cells above be removed. The cells of the inferior occipital plate when full of pus, because of the digastric groove, drain "up hill," unless the inferior table of the plate be perforated, in which case they empty into the deeper structure of the neck.

Campbell.

The Inmates of the Westphalian Deaf-Mute Institute at Soest, Prussia.

DENKER, HAGEN. (*Archives of Otology*, Vol. XXXI., No. 4.) Of 64 pupils the difficulty was congenital in 16, in 32 acquired, in 16 doubtful.

In the perception of pure tones, 25 were perfectly deaf in both ears.

Hearing tests:

1. Islands up to two and a half octaves in 31 ears among 21 children.

2. Tone gaps, 7 ears in 7 children.

3. Large defects in the upper part of the scale, with preservation of the whole lower-tone part, 4 ears in 3 children.

4. Larger defects in both upper- and lower-tone limits, 4 ears in 3 children.

5. Large defects in lower-tone limits with slight sinking of the upper limit, 3 ears in 3 children.

6. Small defects in both upper and lower limits, 15 ears in 10 children.

The result showed 16 pupils possessed sufficient hearing to be suitable for improved instruction; that is, the faculty of hearing tones from b^1 to g^2 was present. This, according to Bezold, is the range of the human voice.

Campbell.

On Diseases of the Ear in Hysterical Subjects.

VOSS, RIGA. (*Archives of Otology*, Vol. XXXI, No. 4.) The author's remarks, which can not be well abstracted, should be read in full.

He concludes that:

1. The objective picture of an acute otitis media may appear as a symptom of hysteria.

2. Pure functional neuroses of the ear should be treated not by an otologist but by a neurologist.

3. In these cases an absolute contra-indication exists against too much treatment, especially of the nose and pharynx.

4. The generally well-known craving of hysterical subjects for operations may also centre upon the ear (and probably also upon the nose).

5. Opening the mastoid process, to relieve the mastalgia of hysterical patients, is absolutely contra-indicated.

6. Our present method of after treatment of radical operations with prolonged tamponing is not at all suitable for children or nervous and hysterical patients. After the fifth day the tampon is entirely superfluous and should be replaced by a simple outer dressing. *Campbell.*

Dizziness.

PANSE. (*Zeitschr. für Ohrenheilkunde*, Band 41.) By dizziness we mean a deception as to our relation to space. This deception, or dizziness, either is felt as changes in the position of the body, or we refer the sensation to our surrounding. It seems as if the room moves forward or backward, or is distorted and rushes upon us. We base our judgment as to the relation of our bodies to space on sensation brought in over three paths: (1) The eye, (2) the organ of equilibrium in the ear, (3) from the muscles, joints and intestines. The author describes clearly the various peripheral and central paths which have a bearing on these functions. Every interruption anywhere in the path leads to a false judgment of position, and thence to dizziness. The value of the work cannot be justly shown in an abstract. *Levy.*

The Pathologic Anatomy of Deaf-Mutism.

SCHWABACH. (*Zeitschrift fur Ohrenheilk.*, Bd. 41.) The post mortem of a deaf and dumb patient showed on the temporal bone, in addition to an acute attack of miliary tuberculosis, a filling of the basal turn of the cochlea by a new growth composed partially of bone and partially of connective tissue. In addition to these, there was degen-

eration in the fibres of the cochlearis, in the ganglion cells of Rosenthal's canal, and defect in the fibers which led to the affected portion of the cochlea. The author thinks that a meningitis in fetal or early life led to an involvement of the labyrinth through the aqueductus cochleae. *Levy.*

What Means, other than Operative, have we in Preventing and Combating Inflammation of the Mastoid Cells.

SAMUEL THEOBALD (*N. Y. Medical Journal*, Sept. 13, 1902) takes the ground that while operation is necessary in advanced cases, proper internal treatment will in many instances prevent operation. As compared with the ophthalmologist the otologist is poorly acquainted with therapeutic remedies for ear disease. Non-operative measures for prevention of mastoid inflammation depends upon whether there is a chronic mastoiditis following inflammatory processes in the ear or following otitis media acuta. For the former, we are to control inflammation in antrum. Proper syringing will attain that end; a solution of bichlorid of mercury 1-8000 to 1-4000 is recommended, used daily at first but soon reduced to once a week, and internally phosphate of iron, quinin, strychnin, with aloin for constipation. Under this treatment "the ear remains for weeks or even months without requiring attention.

In acute otitis, energetic measures will obviate necessity of paracentesis. Locally atropin 4 gr. to ounce and cocain (alkaloid) 8 gr. to ounce of oil of sweet almonds are employed. Internally calomel, scammony and rhubarb and the pyrophosphate of sodium in full doses. As valuable a measure as is paracentesis, can be done needlessly, and is liable to open up a channel of infection.

Even when mastoid involvement is diagnosticated, operation can be prevented. Beside free paracentesis, active purgation as just mentioned and mercury for its systemic effects are advised, given in form of calomel one-fourth to one-half grain every hour to two hours, supplemented by inunctions. No cases of the author are reported, but one by Buck is quoted where success followed such a course of treatment.

[The author's experience is at variance with that of most of us in his successful treatment of chronic suppurative

otitis, and the constant menace to life of an uncured otorrhea should never be lost sight of. The suggestions for treatment of acute otitis are certainly new and worthy of careful consideration. ABSTRACTOR.] *Harris.*

Mastoid Disease in Infants; two Cases in Adults, the two Latter Complicated with Erysipelas.

W. PYRE PORCHER. (*N. Y. Medical Journal*, Oct. 4, 1902.) The two cases occurring in infants are interesting because only a free incision was made into the large abscess behind the ear, without curetting, but with complete recovery in three and eight weeks respectively. This proceeding is quite at variance with the usual method of removal of all diseased tissue. *Harris.*

The Constitutional State Versus Catarrhal Dea ness.

SARGENT F. SNOW (*N. Y. Medical Journal*, Oct. 11, 1902.) makes an earnest plea for a careful attentiveness to all const tutional disorders as a necessary preliminary to successful local treatment to ears; cold baths, silk or wool underwear, a healthy liver, correction of constipation, and all stomach troubles, as well as uric acid and urethral disorders. Vigorous exercise is desirable—such as active arm exercises. In addition all defects in the nose should be relieved. *Harris.*

ccommodation in the Human Ear.

HENSEN. (*British Medical Journal*, Dec. 21, 1901.) Tuning fork is sounded; instrument is made to click; after each click a wave-like increase of the fork note is perceptible, as with other short sound impressions. This might be contrast or accommodation of both. Contrast was excluded as follows, by biting finger or soft object during fork vibration. Increase of note occurred always with the rhythm of the voluntary movement. He attributed this phenomenon to a simultaneous contraction of the accommodation muscle. Further a sounded note did not disappear immediately but recurred one or more times after the sound had stopped. *Wyatt Wingrave.*

Two Cases of Abscess in the Sphenoidal Lobe Presenting No Lesions in the Ear.

LEES. (*Lancet*, May 3, 1902.) Case 1. Girl at 6 years had frontal headache and earache, with occasional vomiting, right optic neuritis, tenderness over right forehead. No paralysis. Ears were normal. Death sudden.

Abscess contained 2 oz. green inodorous pus in right temporo-sphenoidal tube; caries of roof of bony meatus one-half inch from tympanum one-fourth inch in diameter; mucous membrane lining meatus and rest of auditory apparatus normal. Pus yielded pure culture of streptococcus pyogenes.

Case 2. Girl 21 months. Suffered with pain and vomiting 3 months. Lost use of limbs after a fit. Drowsiness; left hemiplegia, double internal squint but no optic neuritis, death.

Small abscess in right temporo-sphenoidal lobe, basic meningitis; middle ear healthy. Small portion of diseased bone almost size of three penny piece above the tympanum.

[Although the tympanic membrane and the rest of the auditory apparatus is described as being healthy the presence of caries in tympanum and meatal roof is strongly suggestive of past disease. The absence of any examination for tubercle is to be regretted. ABSTRACTOR.]

Wyatt Wingrave.

Chronic Otitis Media Followed by Suppurating Bursitis.

BRANSON (*British Medical Journal*, Feb. 8, 1902.) Case of a male, aged 27, subject to ear discharge 20 years. Had appendicitis followed by acute suppuration of the subscapular bursal sac and the corresponding shoulder joint. It was interpreted as a staphylococcal infection secondary to ear trouble. *Wyatt Wingrave.*

Optic Neuritis with Paralysis of Both External Recti Following Suppurative Disease of the Middle Ear.

COLLIER. (*Medical Press*, June 11, 1902.) The Pathology of the condition was attributed by Dr. Hawthorne to thrombosis of cerebral veins and sinuses.

Wyatt Wingrave.

Case of Brain Abscess Following Chronic Suppuration of the Middle Ear.

WOODS. (*Medical Press*, June 11, 1902.) Abscess in cerebellar fossa (subdural) evacuated, followed by abscess in temporo-sphenoidal lobe which was also evacuated; recovery. *Wyatt Wingrave.*

Labyrinthal Suppuration.

V. HINSBERG (*Zeitsch. f. Orenheilk*, Bd. 40) gives from the previous literature and a number of cases observed

by himself, a useful clinical exposition of complication of the labyrinth in otitis media suppuration. The first etiologic feature is trauma, both fractures of the base, and intentional or accidental opening of the labyrinth capsule during operation. Of the cases of stapes extraction for the betterment of hearing, only one led to a mild infection. More dangerous than the intentional is the accidental injury to the labyrinth (horizontal semicircular canal and fenestra ovalis), especially by unskilful attempts to remove foreign bodies. After an injury to the horizontal semicircular canal, there usually appear symptoms of irritation which last only a short time. Among 67 cases of perforation of the labyrinth by pus, the entrance was 17 times through the fenestra ovalis, 2 the fenestra rotunda, 3 both, 27 the horizontal semicircular canal, 5 the posterior canal, 7 the labyrinthal wall. On an average there is one fistula of the semicircular canals to 100 chronic otitis suppuration. Infection of the labyrinth after acute suppurations are very seldom, usually after scarlet fever. In many cases the suppuration is confined to sections, especially to one semicircular canal. The labyrinthal symptoms depend on (1) the collection of pus, as such (2) symptoms of affection or irritation of the end organs of the nerve. The fever usually remains low, often is entirely absent. Hearing is absent in very pronounced labyrinthal affections but can be surprisingly good, however, when this is a localized process.

Dizziness is a very frquent symptom, but can eventually disappear. The symptoms of irritation are subjective noises, nystagmus, uncertain gait, unequal pupils, headache, nausea and vomiting. Labyrinthal suppuration sometimes heals, even without treatment with normal or slightly defective hearing. Often, however, meningitis supervenes. A cranial complication was present in 108 out of 198 cases, 43 times the path of the infection could be demonstrated, 25 times it was through the porus acusticus internus; once through this and the aqueducts; 8 times through the aqueductus vestibuli; once through the aqueductus cochleae; 8 times through a fistula in the vertical semicircular canal. In 92 cases there was cure, in 60 meningitis, in 6 meningitis and brain abscess, in 13 cerebellar abscess, and 25 times death followed from other

causes. In some of the cases a favorable effect was caused by the operations, but sometimes meningitis followed close upon it. Nevertheless the author recommends operation in certain cases of labyrinthal suppuration, but by means of the burr instead of the chisel on account of the danger of concussion of the brain. He describes a method of doing this without injuring the facial nerve. In his experience, the good results of the operation outweigh the danger connected with it. *Levy.*

Four Cases of Meniere's Symptom Complex.

R. BYLSMA. *(Monatschrift f. Ohrenh.*, 36 jahrgarg, No. 2.) The author carefully describes the anatomical substratum of the disease. It was due in one case to a temporary closure of the tube and disappeared after a single catherization. In the second case there was acute labyrinth affection, with cure by general treatment. In the third case there occasionally appeared dizziness, nausea, difficulty in hearing and unbearable noises. The hearing at other times was intact. The cause was an acute glaucoma, with cure by treatment with eserin. The fourth case was due to middle-ear disease. Installation of pilocarpin and massage relieved the dizziness.

Levy.

The Treatment of Chronic Dry Catarrh of the Middle-Ear by the Pneumatic Chamber.

HAMM *(München. Med. Woch.*, 1902.) had used the ordinary methods of treatment on himself and his patients without any result. He then treated eight cases by making them sit in the pneumatic cabinet. In every case there was a favorable influence on the hearing and tinnitus. In three cases the result was lasting. The length of treatment was one and one-half hours, of which 25 minutes was occupied in increasing, and 40 minutes in decreasing the pressure. The pressure was first one and a half, later two and a half atmospheres. Number of treatments 25–40. The author desires further tests.

Levy.

The Involvement of the Casserian Ganglion in Otitis Media Suppurativa.

R. HELGERMANN *(Zeitsch. f. Ohrenheilk.*, 40 Bd.) directs the attention to a path hitherto little observed, by which pus can reach the meninges from the middle-ear.

The root of the trigeminus passes under the attachment of the tentorium cerebelli through a wide space in the dura. The gasserian ganglion lies extradural, near the point of the pyramid, in a shallow excavation. A suppuration can involve the gasserian ganglion, and secondarily the meninges by infection of the pneumatic spaces, which often extend to the inner surface of the cranium and the point of the pyramid. In addition to several doubtful cases, the author found two indisputable ones where the infection took this path, and reports a similar one from Breslau Clinic. Moreover, the plexus carotidum, and from this the plexus sinus cavernosum with which it communicates, can also be infected. On account of the relationship between the sinus and the gasserian ganglion, whose inner portion touches the outer wall of the sinus, a way of infection is here possible. An undeniable case of this kind could not be shown. *Levy.*

The Theory of Cross Education as Applied to the Auditory Apparatus.

LEWIS S. SOMERS, Philadelphia, Pa. (*Amer. Jour. Med. Sciences*, Oct., 1902.), has made a number of experiments on cases of so-called sclerotic or catarrhal otitis media to ascertain whether treatment of one ear causes improvement of the opposite ear. He has found this to be the case to a certain degree, and has observed clinically that in many instances there is an improvement in the hearing of the non-treated ear at the same time with the treated one in cases where only one is treated. An improvement has also been noted in connection with tinnitus, the principal treatment here being massage. The cross relationship between the ears probably depends upon some anatomic and reflex connection, either through the sympathetic and cranial nerves or through the decussation of the auditory fibres within the brain. The original paper is well worth careful study. *Richards.*

Tinnitus Aurium.

G. GRIFFIN LEWIS, Syracuse, New York, (*Philadelphia Medical Journal*, June 28, 1902). reviews the various causes that produce or are supposed to produce tinnitus aurium, together with the details of the examination to determine the cause and the various remedies used for the condition. The very number of the remedies shows

how unsatisfactory in the main is the treatment of this condition, and how seldom we either ascertain the true cause, or having ascertained it, are able to remove it. In the author's experience he has found massage with a mechanical masseur to be more effective than any other treatment, especially for those cases in which there are ankylosed or adherent ossicles. *Richards.*

Fetal Disease of the Labyrinth Following an Encephalitis Hemorrhagica.

H. HAIKE. (*Arch. f. Ohrenh.*, Bd. 55.) It has never been possible to determine the etiology of congenital labyrinthal affections which cause deaf-mutism. Although it was formerly thought that the labyrinthal changes found post mortem in deaf-mutes, such as ossification of the labyrinth and cavity formations, were developmental anomalies, we now know that, usually, the cause is a fetal labyrinthitis. It was deemed probable in many cases that the brain was the starting point, but proof was lacking. This is furnished by Haike. The post mortem of a four-day-old child showed a complete destruction of the cerebral hemispheres, with plain traces of a previous hemorrhagic inflammation. In the temporal bone was found a destruction of the nervus cochlearis in the inner auditory meatus, caused by hemorrhage. In addition to this, there were hemorrhages in the cochlea, especially in the scala tympani, and degeneration of the cells of the ganglion spirale. A further development of the process would certainly have led to the changes found on deaf-mutes. *Levy*

The Predisposition to Aural Affection in Children Caused by Tubercular Ancestry.

OSTMAN. (*Archiv. f. Ohrenh.*, Bd. 55.) Ostman's extensive tests on public school children show that the descendants of tubercular ancestors are affected more often and more severely by aural diseases than others are. The greater the inherited taint, the oftener and severer is the disease. *Levy.*

Tuberculosis and the Ear.

KLUG. (*Ungar. Med. Presse*, No. 24, 1902.) Tuberculosis of the ear occurs usually as a chronic suppurative process of the middle ear, developing secondarily to tubercular processes in other organs. An infection occurs most commonly through the Eustachian tube, probably during

the act of coughing, though it may also take place through the external meatus, when a previous perforation of the drum membrane has existed. It may finally arise through infection by the way of the lymph channels and blood vessels.

Tuberculosis of the drum membrane is rarely seen in its early stage. In one instance, observed by Habermann, tubercles were found on the drum membrane, occurring as yellowish, slightly-prominent specks, rapidly disintegrating, and leading to complete destruction of the membrane.

Not every discharge from the ear in phthisical individuals is tubercular, and, even in suppurations of undoubted tubercular origin, the demonstration of bacilli is frequently difficult.

The most characteristic symptom is pain, with the absence of reaction. A variety of complications may occur, occasioned by the extension of the ulcerative process. At times, especially in scrofulous children, the process runs a more rapid course, with more abundant granules. Osseous sclerosis is observed, and there may be an apparent healing of the process in the bone, covering over with firm epidermis.

Prognosis is more unfavorable in young individuals. Where tuberculosis of the lungs exists, operative treatment is less productive of favorable results.

Treatment consists first in freeing the middle ear and allowing the escape of the discharge. The best results are attained in suitable cases by radical operation, which should be done as early as possible.

Patients with middle ear discharge should be properly instructed how to introduce cotton into the ear, and should learn the importance of destroying everything which comes in contact with the discharge for the purpose of preventing an extension or transmission of the infection.

Goodale.

Hysteria Following Otitis Media Acuta.

UNGAR. (*Med. Presse*, No. 12, 1902.) Szenes, a woman 23 years of age, was taken with acute inflammation of the middle ear, accompanied with severe pain, requiring paracentesis. During convalescence, severe pains recurred, which did not yield to aspiration or inflation of

the ear. Two days later, severe headache, nausea and vomiting, with left-sided orbital pain, supervened. Examination was otherwise negative. In consultation, a diagnosis of hysteria was made, which yielded only after four weeks' appropriate treatment. *Goodale.*

II.—NOSE AND NASO-PHARYNX.

Some Modifications of the Author's Original V-Shaped Operations for Correction of Deflection of the Septum.

D. BRADEN KYLE, Philadelphia. (*American Medicine.* May 31, 1902.) This operation has already been described and illustrated. Modification consists in the use of a V-shaped file saw originated by Dr. George Fetterolf, and described in American Medicine, March 1st, 1902. Dr. Kyle, finds that this instrument removes the V-shaped piece in many instances better than his own small curved saw previously described. Otherwise the operation is unchanged. *Richards.*

Empyema of the Antrum of Highmore, with Ptosis and Diplopia. Understudy of Treatment on the Ocular Disturbances.

(*Medical Record*, June 28, 1902.)

Pathology of Empyema of Highmore.

H. N. HOOPLE, Brooklyn. (*Medical News*, Aug. 16, 1902.) In the first article the author records two cases of empyema of the antrum treated by the anterior end of the middle turbinate. The first one is of interest on account of having had severe troublesome hemorrhage on several occasions. Recovery took place on the establishment of good drainage, from natural opening without further operative procedure.

The second case had considerable tenderness over the malar bone, with very bad smelling pus, and also a history of hemorrhages.

In the second article a review of the pathology and literature of antral empyema is given. The author evidently does not believe that exploratory puncture and irrigation are justified in a case that is apparently getting well, no matter what might be missed in diagnosis thereby; and thinks that spontaneous recovery can take place even

though one has never seen it, and quotes various authors in proof that this does occur.

(So far as exploratory puncture is concerned, the reviewer regards it as always justified whenever diagnosis is in doubt; and thinks that cases which get well spontaneously would get well much more rapidly if the cavity were washed out by means of a hollow exploring needle. The procedure is not especially painful, and has few contraindications.) *Richards.*

Rhinoliths and Foreign Bodies in the Nose.

J. M. INGERSOLL, Cleveland, O. (*Medica Record*, Apr. 12, 1902.) After considering the general subject of foreign bodies, the writer reports an interesting case of rhinolith that formed around a bean, and which at the time of removal weighed two grams. It had produced entire obstruction of the left nasal fossa for thirty years, with broadening of the left side of the nose and a pushing of the left nasal bone forward and upward. It was an irregular, jagged formation, and was removed in many pieces with the aid of forceps. On being shown the bean, the patient remembered having put one into his nose when he was a small boy.

He also reports the removal of a much smal er rhinolith from the left nasal fossa of a young lady. This had been in existence several years, and its nucleus was a pea.

Richards.

Maxillary Antral Suppuration, with a Report of a Case.

LINN EMERSON, Orange, N. J. (*Amer. Medicine*, Apr. 19, 1902.) This was an acute case in which natural drainage was brought about by shrinking of the tissue around the natural outlet with adrenalin and by having the patient assume the proper position. Douching affected a cure in in a few days. *Richards.*

Adenoma of the Nose, with Incipient Sarcomatous Metamorphosis.

EMIL MAYER, New York. (*American Medicine*, Aug. 2, 1902.) The patient a man of 68, had been under treatment for six years for numerous polypi, with a suspicion that the growth had become of a sarcomatous nature, and was referred to Dr. Mayer for radical operation. The left side of the nose over the nasal bones was distended, and a large tumor presented on the left side of the nose, while

both nostrils were occluded. The tumefaction was soft and yielding to the touch, but not painful, and the mouth was habitually open. The mass extended into the posterior nares. It was impossible to determine how much of the superior maxilla was involved. A diagnosis of a myxomatous tumor with probable malignant change was made and a radical operation determined upon. Tracheotomy was first performed and the patient anesthetized with chloroform through the tube. The posterior nares and the mouth were packed with gauze. "An incision was made, beginning near the inner canthus of the left eye and close to the edge of the tumefaction, brought around close to the alae and down to and through the median line of the upper lip. The mucous membrane of the nose which was intact was cut through and the nose drawn aside with retractors. The slight bleeding was checked with artery clamps. An immense growth now presented, which was thoroughly evulsed by means of forceps and curette. It was found that the whole mass had originated from the left middle turbinated bone and this place was thoroughly cauterized. There was entire absence of the vomer, the nasal bones on the left, and most of the superior maxilla that formed the hard plate. The cartilaginous septum was not affected, while the bones had entirely absorbed. There was no evidence, however, of involvement of the bone, so far as the growth was concerned; hence no part of the superior maxilla was removed. The nose was now brought back to its original position, the parts coapted and sutured, plugs removed from the mouth, but not from the posterior nares; the tracheotomy tube left in situ, and the patient put to bed. There was no subsequent hemorrhage and some of the packing was removed each day, until on the fifth day no further packing remained. The alae having a tendency to fall in, two Mayer tubes were introduced. On the tenth day the tracheotomy tube was removed and the wound healed slowly by granulation. The nose was cleansed frequently with sprays. At the end of the third week the nasal tubes were removed and he was discharged from the hospital cured, with very little cicatrization showing, breathing freely through both nostrils, and from being an object of abhorrence and pity is now a useful member of society in his sphere of life, and as he puts it "a new man and a happy one."

Histologically the growth proved to be an adenoma with incipient sarcomatous metamorphosis. *Richards.*

Chronic Empyema of the Frontal, Ethmoidal, and Both Sphenoidal Sinuses.

JOS. H. BRYAN, Washington, D. C. (*American Journal of Medical Sciences*, Sept., 1900.) Patient was a woman of 48 years, who was under observation for three years with extensive necrosis of the sinuses named, probably complicated with an adenoma of the posterior ethmoidal and sphenoidal regions. She was operated on at various times, with partial relief and temporary subsidence of symptoms. After many attempts the adenomatous growth was finally entirely removed; and for an interval of one year there was no return. The suppurative inflammation finally disappeared, and at the time of report there was only one small cell in the posterior ethmoidal region where pus is formed. *Richards.*

Syphilitic Necrosis of the Nasal Cavity, Accompanied With Total Blindness.

CHARLES A. TODD, St. Louis, Mo. (*Philadelphia Medical Journal*, Sept. 20, 1902.) A case of tertiary syphilis in a man of 47, in which destruction of the bony portion of the nose had been going on for several years and was finally accompanied by marked diminution of the field of vision, the power of central vision, with atrophy of the optic disc. Healing of the nose and improvement of the eye conditions took place under large doses of iodide potassium and of protodide of mercury. *Richards.*

Acute Empyema of Frontal Sinus—Operation, Death.

VON WILD, Frankfort, A-M. (*Archives of Otology*, Vol. XXXI, No. 4.) A healthy young woman was taken suddenly ill with coryza and left frontal headache. Temperature 39° C. Vomiting set in the following day. Examination of the nose revealed a yellowish-white discharge at the left infundibulum. Transillumination of sinus negative. Cocain lessened the turbinate swelling and pus discharge was free. Temporary improvement was followed by an aggravation of symptoms. Delirium, left mydriasis, upper eyelid edematous. The sinus was opened, yellowish-green odorless pus evacuated. The mucous membrane at the upper and inner corner was

thickened, infiltrated and discolored. No bony defect could be discovered. In the posterior wall a window was made; the dura seemed tense but on incising it no cerebro-spinal fluid escaped. Punctures made into the brain were negative. Coma set in. Petechial hemorrhages appeared at the ankles. Death. No autopsy was permitted. *Campbell.*

Changes in the Blood Vessels of the Nasal Mucous Membrane in Nephritis.

SCHONEMANN (*Archiv. für Laryngol.*, Bd. 12) found, in 8 patients who died of nephritis, changes in the nasal mucous membrane which he regards as typical, on account of their constancy. Often, the nasal mucous membrane was seen, macroscopically, to be yellowish, discolored and covered with brownish spots. Microscopically, it was found that the number of capillaries lying near the epithelium had increased; that, in many places, they had broken through the basal membrane, and that solitary loops of capillaries had forced their way between the basal epithelial cells. The capillary wall and epithelial covering easily ruptured, and blood flowed out of the capillaries onto the superficial surface and into the mucous membrane. The capillary walls did not seem much changed, nor did the larger, deeper vessels. The author thinks that the toxins circulating in the blood of the nephritic patient makes the vessel wall more fragile. *Levy.*

The Probing of the Ductus Nasolacrymalis from the Nose.

L. POLYAK. (*Archiv. für Laryngol.*, Bd. 12.) The probing of the lacrymal passages often gives the oculist much trouble, principally because the sclerosis usually lies in the membranous portion, and the narrow, bony canal allows the passage only of small probes. For this reason, several oculists have tried probing through the inferior opening. For this purpose, the author has made the attempt in numerous cases, with an instrument specially constructed with respect to the anatomical conformations, and recommends that it be tried a great number of times. Usually it is necessary to excise the anterior end of the inferior turbinate. Then it is always possible to penetrate 15 to 20 millimeters into the passage with the instrument, whose inferior arm should be bent at nearly a right angle, and have a thickness of 4 mm. It was pos-

sible in every case to introduce the largest size, even the first time. Under cocain, the procedure gives little pain. It is indicated when the disease is of nasal origin, and when the stenosis is in the inferior portion of the passage, and when there is no very severe affection of the lacrymal sac. *Levy.*

Clinical Contribution to the Study of Empyema of the Frontal and Ethmoidal Sinuses, Complicated by Eye Disease.

MAX TOAPLITZ (*N. Y. Medical Journal*, Sept. 6, 1902) reports a case of sinusitis frontal occurring in a man of 48. The patient had a history of a previous attack 4 years before. When seen by the writer, he complained of severe pain in right forehead. Pus was seen in the nose. A curettage of the ethmoid was performed. Great swelling of eyelids followed almost immediately. Incisions into lower lid failing to find pus, an external operation on sinus was performed, with removal of pus, polypus and carious bone. The extreme swelling of lid was not relieved, even by a subsequent incision, and spontaneous bursting evacuated considerable pus. Subsequent recovery uneventful. Toaplitz is inclined to advocate the intranasal method of operation as a conservative and preliminary method of treatment, resorting to the external operation later, if necessary.

[Experience is beginning to show us that the latter method, in chronic cases, is the wiser, as it certainly is the safer one to pursue, even from the start.—ABSTRACTOR.] *Harris.*

Ethmoidal Mucocele in a Man Aged 26.

BOWLBY. (*Lancet*, May 3, 1902.) There was history of nasal obstruction and of swelling in the left orbit. Turbinals were removed, but swelling increased with displacement of left eyeball. *Wyatt Wingrave.*

Congenital Absence of Nose and Anterior Nares.

WYNTER. (*Lancet*, May 3, 1902). Female, six weeks old; first child of healthy parents. No hare lip and premaxillæ perfectly developed. There was difficulty in suction and respiration. No cleft palate present.

Wyatt Wingrave.

Treatment of Chronic Suppuration in Frontal Sinus.

LACK (*Edinburgh Medical Journal*, June, 1902) advocates intranasal treatment as a necessary preliminary to

the external. There is not much danger in letting alone, after establishment of free drainage. He prefers supra-orbital incision. Infundibulum should be cleared, a large rubber tube passed into nose, the upper end fixed to inner angle of incision and the rest of wound sutured. This should be replaced by vulcanite plug with shoulder resting on supraorbital margin and removed once daily and syringed. *Wyatt Wingave.*

The Treatment of Hay Fever.

A. SIMON. (*Deutsche Med. Woch.*, 1901, No. 28.) In a case of hay fever which appeared every summer for nine years, a prompt relief was obtained by the use of atropin sulphate. The nasal and conjunctival catarrh was not influenced by treatment. *Levy.*

Case of Primary Nasal Tuberculosis.

HALASZ (*Ungar Med. Presse*, Nos. 9 and 10, 1902) reviews the literature of the subject, with regard to infection and diagnosis, and reports the case of a woman, 40 years of age, who came with a history of catarrh of 6 months duration, accompanied by frequent nosebleed and a swelling of the bridge of the nose. Examination showed a diffuse reddening and infiltration of the nasal vestibule, together with a perforation of the cartilaginous septum, bordered by an infiltrated margin, together with granular excrescences on the floor of the nose, which extended over the lower turbinates to the posterior nares. A specimen was excised from the lower turbinate, and showed a granuloma upon a tubercular basis. *Goodale.*

A New Treatment for Hay Fever and Allied Complaints.

E. FINK (*Deutsch. Med. Woch.*, 1901, No. 46.) regards this affection as a secretory neurosis of the nasal mucous membrane, due to changes in the endings of the trigeminal secretory fibres. He thinks he has proven that the secretion comes only from the neighboring cavities. Since then he has directed his therapy toward the antrum of Highmore, with treatment of the general neuropathic condition in addition. Good results were obtained by insufflation of aristol. *Levy.*

III.—MOUTH AND PHARYNX.

A Fatal Case of Acute Primary Infectious Pharyngitis with Extreme Leukopenia.

PHILIP KING BROWN, San Francisco. (*American Medicine*, April 19, 1902.) Patient was a female, aged 29, with a family history of tuberculosis. She had been operated upon for lacerated cervix and perineum, having left the hospital three weeks after, well established in convalescence; but the third day after reaching home she arose and went down stairs barefooted, clad only in her night dress. This was followed by chilly sensations, pulse of 120, temperature 103, and with sore throat. On examination the pharynx and tonsils were reddened, the latter slightly swollen. There was no membrane or pain on swallowing. Symptoms became rapidly worse; temperature went to 105, the throat became dark red, and the left tonsil more swollen. During the next few days edema and swelling of the tonsils continued until it became so great that it was decided to examine thoroughly for possible pus formation. Scarification was decided upon because of the suggestion of fluctuation on palpation. This was done on the sixth day, but with negative result. An agar tube inoculated with the knife used for the incision showed staphylococcus pyogenes albus and aureus. After this a membrane formed over the wound area and persisted until death, which occurred from edema of the glottis of very sudden onset on the seventh day. Diptheria antitoxin was given, but without result. Autopsy showed the presence of staphylococcus pyogenes albus of pure culture from the blood of the heart, the bone marrow of the femur, epiglottis and the left kidney. The right kidney and uterine wall showed bacillus coli communis, and the uterus, bacillus coli communis and staphylococcus albus; showing the most extensive general infection. *Richards*,

Six Cases of Operation for Cleft Palate.

C. A. PORTER, Boston. (*Boston Medical and Surgical Journal*, Feb. 6, 1902.) These varied in age from 9 months to 35 years, and in five of the cases good results were obtained. Chloroform anesthesia is preferred to ether, owing to the more quiet breathing and the absence of mucous. The whole cleft is carefu ly and completely denuded by grasping the t p of the uvula with fine forceps

and cutting from before backward, on each side, a continuous strip of mucous membrane about one-eighth of an inch wide. If the edge of the flap appears too thin it may be split for one-eighth of an inch before suture, thus getting a broader surface for approximation. Two lateral incisions are made from the level of the canine teeth, close to the margin of the alveolar arch, back to and through the fan-like expansion of the tensor palati muscle. This avoids tension on the stitches of the soft palate, and after healing, the tensor palati resumes some of its functions. The levator should not be cut. The edges to be sutured should never be crushed by grasping with forceps, and all tension must be avoided. Care must be taken to use no more stitches than are necessary, and they must not be tied too tightly, which is the usual rule, owing to the difficulty of tying in such a small space, and to the almost invariable struggling under the anesthesia. Swelling follows, and the sutures, which at the operation appeared loosely tied, are found to be cutting on the second day. The author places the stitches three-eighths of an inch apart, and the same distance from the edge of the wound. He prefers silk, previously soaked in Balsam of Peru. He removes all the stitches at the end of a week. In the case of young children the child is held firmly in bed, on its back, with a swathe. The hands are confined at the wrist by a band pinned to the swathe in such a way that while a certain amount of action is possible, neither hand can reach the mouth. Both nostrils are plugged with cotton wool as soon as the child recovers from the ether in order to bring about mouth breathing, as this causes the palate to remain dry instead of moist, and there is less maceration. The confinement causes the child to be very restless and fretful, requiring most careful nursing. It is kept from crying by small repeated doses of bromid and chloral or deodorized tincture of opium. Saline nutritive enemat are given every six hours, and not until the fourth or fifth day are liquids given by the mouth. The after treatment is important. Adhesions about the palate should be divided, and the soft palate excised, massaged and made movable by voluntary contractions in adult cases, and by passive motion and stretching with the finger in children, The power of good speech is almost always in direct ratio

to the time spent in instruction and the intelligent effort of the patient. *Richards.*

Anomalous Position of the Common Carotid, Visible in the Pharynx.

GEORGE B. WOOD, Philadelphia (*American Journal of the Medical Sciences*, Sept., 1902), has seen two cases of pulsating artery on the right side of the pharynx. In one of them the beat of the right carotid could be readily traced from above downward, beginning at a point about one-quarter of an inch above the upper edge of the thyroid cartilage. On the right side of the pharynx, projecting at times almost to the median line, was a large pulsating blood vessel about the size of a leadpencil; and by forcibly depressing the tongue this bloodvessel could be seen running from below upward and slightly inward until it reached a point about opposite the uvula, where it took a course slightly outward and upward. The patient was a child of five, and the condition was discovered by accident.

In the second case, which was in a boy about seven, the findings were substantially the same. *Richards.*

Hypertrophy of the Lymphoid Tissue at the Base of the Tongue as a Cause of Cough.

HERMAN JARECKY, New York. (*American Journal of the Medical Sciences*, July, 1902.) Twelve cases are reported, all of which were improved by treatment. Excision of the lymphoid tissue with the tonsillitome of Myles gave the best results. *Richards.*

Tumor of the Pharynx: An Accessory Thyroid Gland. Removal Followed by Myxedema.

E. L. SHURLEY, Detroit, Mich. (*Philadelphia Medical Journal*, Sept. 13, 1802.) Patient was a girl 16 years of age, with good family history, annoyed by progressive desire to swallow and some difficulty of deglugitition while eating. Examination showed a dark-red, globular, smooth, broadly pedunculated tumor about the size of a small hen's egg, attached well down at the very base of the tongue, a little to the right of the median line and close to the epiglottis, but not infringing much upon that structure.

Under chloroform anesthesia, the tumor was removed by means of a heavy wire snare. Considerable hemorrhage was encountered, requiring constant attention for two hours, and was controlled by a gauze compress saturated

with an adrenalin solution held over the site of the growth by the fingers. Three weeks after removal she showed well-marked signs of myxedema, such as swollen skin, especially ahout the eyelids, mental dullness and physical debility. Under two to five-grain doses of thyroid gland given three times a day, there was rapid improvement.

Richards.

Keratosis of the Pharynx.

CHAS. W. RICHARDSON, Washington (*American Journal of the Medical Sciences*, Oct., 1902), regards the condition commonly known as mycosis pharyngea leptothrica to be not mycosis at all, but a keratosis, and that the presence of the leptothrix is rather an accidental deposit and without causative relation to the structural changes. Structurally the tufts are found to be small, tough, horny-like in hardness, firmly adherent to the mucosa, from which they can be separated only with difficulty. When forcibly removed they rapidly reproduce. They are more frequent in Waldeyer's lymphatic chain, although the condition is not limited solely to this region. The growth is most abundant on or about the tonsils and at the base of the tongue. They are observed also on the pharynx wall, glosso-epiglottic folds and fossæ. Examination has shown the masses to be made up of a central narrow lumen containing bacteria, detritus and mucus, surrounded by an epithelial wall, composed partly of layers of hardened, unnucleated epithelial cells and partly of a homogenous, horny substance. Attention is drawn to the work of other observers corroborating these opinions. The author's report is preliminary to a more full report along the line of the scientific study of the etiology and pathology of this disease, which he is making and which is to be published later. *Richards.*

Angina.

V. UY (*Ungar. Med. Presse*, No. 22, 1902) recommends, in cases of angina, aspirin in 3-grain doses, taken as soon as the first symptoms are noticed. *Goodale.*

Contribution to the Statistics of Carcinoma of the Tongue.

K. RODIGER (*Beitrag. z. Klinic. Chir.*, Bd. 31) has considered, from a statistical and clinical standpoint, the 31 cases treated in the Heidelberg Surgical Clinic in last 13 years. 19.35 per cent. were women. Age of the patients between 37 and 80 years, most of the patients between 46

and 50 years. Metastases were found in 22 cases, but only in the neighboring parts. Of importance is the fact that in carcinoma of one-half the tongue, the glands on the other side, and even the cervical glands, may be infected. Nevertheless, only the swollen glands were excised. Only one case of carcinoma was inoperable. The six cases operated on with the galvanocautery gave somewhat better results than those operated on with the knife. In 7 cases a lasting result was obtained, and the more extensive operations turned out better than the single ones. *Levy.*

Chancriform Ulcer of Tonsil, or Vincent's Angina.

THOMSON. (*Lancet*, May 3. 1902.) Boy, aged 12 years. Sore throat 4 days. Oblong gray slough on right tonsil, which was easily detached. *Wyatt Wingrave.*

The Curability of Pharyngeal Tuberculosis.

JULIUS VEIS. The author had the rare experience of observing 5 cases of pharyngeal tuberculosis. In some of them pulmonary tuberculosis was present. Only in the first case was the diagnosis confirmed by the anatomic examination. In every case there were large ulcers, without tumors. The diagnosis from gumma and carcinoma usually was not difficult. For treatment, he used concentrated trichloracetic acid about every 4 or 5 days. To stop the pain, he employed 10 per cent. orthoform powder. In this way he obtained a cure in every case, with slight cicatrization. *Levy.*

IV.—LARYNX.

A Case of Intratracheal Colloid Struma; Operation; Recovery.

CLEMENT F. THEISEN, Albany, N. Y. (*American Journal of the Medical Sciences*, June, 1902.) Patient was a woman of 32 years of age who had a goitre of moderate size. On examining the larynx a tumor of considerable size was found springing from the posterior and left lateral walls of the trachea, almost completely filling its lumen. It was regular in outline and covered with a perfectly smooth, normal-looking mucous membrane. Operation was done on account of the severe dyspnea, and was especially difficult, on account of the enlarged thyroid isthmus, making it unwise to do the preliminary low

tracheotomy. The exposure of the trachea was difficult, and a high tracheotomy had to be done early in the operation. The trachea being exposed a low tracheotomy was then performed, the upper tube taken out, and the tracheal rings above the tube split, as was also the cricoid. The tumor, which was over five cm. long, extended from the first tracheal ring downward along the posterior wall, and almost filled the tracheal lumen. It was firmly attached by a broad base to the posterior and left lateral walls of the trachea from which it could not be separated. As much of the growth was removed as was possible with snare and curette, adrenalin solution being used continuously on account of the severe and troublesome hemorrhage. On account of this latter and because of the condition of the patient, it was found impossible to entirely remove the portion of the tumor attached to the posterior wall. The tracheal wound was sutured with catgut. During the process of convalescence the patient had double pneumonia during which nitroglycerin 1/30 gr. was given every hour, with 1/30 gr. of strychnin every three hours. A condition of extreme collapse followed, during which hypodermic injections of 1/20 of a grain of nitroglycerin were given every twenty minutes, followed by most marked results, the pulse improving in quality in a few minutes after each injection. A second period of extreme collapse following, it became evident that the trachea below the tube was filled up. Tube was removed, the patient held over the side of the bed with the head very low, and with a pair of long, narrow, curved forceps considerable solid mucus which could not be expelled through the tube was removed. After this there was improvement in breathing and final recovery.

The author regards the nitroglycerin, which was given in varying doses continuously for many days, as having been an important element in the recovery. Patient was discharged from the hospital 29 days after the operation.

Pathologist's report showed colloid struma, originating in thyroid tissue. A review of the published cases of similar nature follows, with an extensive bibliography.

Richards.

Subglottic Sarcoma Removed Endolaryngeally with Galvano-Cautery Snare.

J. W. GLEITSMANN, New York. (*Medical Record*, July

5, 1902.) The growth was in a man 52 years of age, whose only complaint was of a dry cough, some bloody expectoration, some dyspnea and a very hoarse voice of four months duration. The patient was extremely docile and easy to examine. Below the vocal cords, and having its point of fixation anteriorly, and at the beginning of the trachea, was a growth which filled the larger part of the tracheal space. Under the application of cocain and adrenalin (preparations for tracheotomy having been made), Dr. Gleitsmann was able by means of a Schech's handle and canula and iridoplatinum wire to throw the snare around and under the growth. The wire was tightened very slowly. The removal was effected at the first introduction of the wire snare, and the tumor brought through the glottis without difficulty. The basis was cauterized immediately afterward with a flat galvanocautery burner. Microscopic examination showed the growth to be of sarcomatous character, partly round-celled and partly myxosarcoma. *Richards.*

Tuberculosis of the Larynx and Pregnancy.

A. KUTTNER. (*Archiv für Laryngologie*, Bd. 12.) For a long time we have known the baneful effect of pregnancy on tuberculosis of the lungs. In regard to the connection with laryngeal tuberculosis, no papers have been published. The author has undertaken the task of collecting material for the solution of this question from his own experience and from reports from other physicians. The author has collected 15 cases, 8 were primiparae, 7 multiparae. 3 plainly suffered from pulmonary tuberculosis. In the 12 others, there were no symptoms at the time of the beginning of pregnancy. In 2 patients, the tuberculosis was healed before the inception of pregnancy. Of the children, at the time of the conclusion of the investigation 3 were still living, the others died a few days or weeks after birth. All 15 mothers died a short time after birth of children, at the latest 56 days afterward, althrough the delivery progressed normally. The larynx showed in all cases a high degree of swelling in the superior part of the larynx, and later degeneration. A mortality of 100 per cent. causes the author to recommend an artificial abortion, without paying any attention to the child which usually dies anyhow,

whenever any hope remains of saving the mother, at least in the earlier months of pregnancy. In this way it may be possible to save the mother in a few cases. *Levy.*

A Necrotic Bone Embedded Under the Glottis.

A. ONODI. (*Monatsschrift für Ohrenheilkunde*, 35 Vol.) A 32 year old man, infected with lues 8 years before; 3 years ago dyspnea in increasing degrees appeared, which disappeared under sublimate injections; 2 years ago he coughed out a small piece of bone; he came to the writer suffering with a sudden attack of suffocation. Laryngoscopically, a foreign body was found. This was removed by an incision in the larynx and was found to be a necrotic piece of bone. The dyspnea disappeared, but aphonia remained as a result of fixation of the vocal cords. The author explains the condition as follows. On the basis of the lues, there appeared a perichondritis of the cricoid cartilage which caused its ossification and later an extrusion of a piece of bone. The fixation of the cords could be explained in different ways, e. g. through changes on the point of the arytenoid cartilage or in loss of its attachment or muscles. *Levy.*

Bilateral, Total, Recurrent Paralysis.

PROF. MYGIND (*Archiv. für Laryng.*, Bd. 12) adds his personally observed case to the 16 previously known. A tubercular patient suffered with pain in swallowing and hoarseness. The examination showed a cadaveric position of the vocal cords. The esophageal sound met an obstruction in the superior portion of the esophagus. Post mortem, a carcinoma was found which involved both recurrents. Microscopically, an infiltration of the nerve sheathes with carcinoma cells was seen. The recurrents, as well as the muscles supplied by them, showed high degree of degeneration. The fact that the cricothyroideus, also, was degenerated would indicate that this muscle was at least partially supplied by the recurrent. *Levy.*

Tracheal Sarcoma.

PROF. KILLIAN. (*Archiv. für Laryng.*, Bd. 12.) A young lady, 25 years old, began to spit blood. He found, as the cause of this, a tumor of the left tracheal wall, about half way down, which narrowed its lumen to one-half and caused dypsnea. The author was able to use direct tracheoscopy, under cocain, by introducing a corresponding tube,

9 mm. wide and 20 cm. long. It was possible, after some effort, to remove a large piece of the tumor, which was found to be a large-celled sarcoma. On account of the evident benignity of the growth, the author resolved to remove the remainder by the same method. He used the cold snare, afterward cauterizing the base with the electric cautery. One and a half years later the patient had not had a recurrence. *Levy.*

Post-Operative Laryngeal Hemorrhage Checked by Solution of Gelatin.

B. GOLDSCHMIDT. (*Therap. Gegenwart*, 1902.) After the author had curetted the aryepiglottic folds of a phthisical patient, the resultant hemorrhage could not be checked by the ordinary means. By syringing some drops of gelatin solution on the wound, he was able to stop it at once.

Levy.

The Diagnosis of Laryngitis Circumscripta.

G. RICHTER. (*Monatschrift f. Ohrenheilk*, 36 Jahrgang, No. 2.) B. Frankel has described a form of laryngitis in influenza, characterized by white spots on the vocal cords. These spots, which are probably fibrinous infiltration, were observed once by Glatzel on the false cords, The author has seen only 4 cases. Three times the infiltration was on the false, once on the true, vocal cords. Influenza was not present in any of these cases. The incubation period was 2 to 3 days; the duration of the disease, 3 to 7. The symptoms consisted of chills and fever, sensation of sticking in the larynx, dyspnea when in recumbent position, coughing and a slight hoarseness. *Levy.*

Croupous Laryngitis, with Protracted Course.

SZONTAGH. (*Pester Med. Chir. Presse*, No. 30, 1902.) A child, 3 1/2 years of age, was taken with laryngeal croup, characterized by a broad membranous deposit. Twenty-five hundred units of antitoxin were injected, but the symptoms increased in severity, and intubation was necessary. Five thousand units were injected in the next two days. After the removal of the tube, suffocation immediately occurred, and rendered its replacement necessary. Ten days after the beginning of the illness the tube was again removed, and a small amount of croupous exudate coughed out. During the next two weeks, portions of membrane were continually coughed out, and suffoca-

tive attacks occurred, rendering intubation again necessary. The croupous process lasted for a period of 31 days, during 26 of which intubation was necessary.

Goodale.

Course of Laryngeal Tuberculosis in Pregnancy.

VEIS. (*Wiener Med. Blatter*, No. 20, 1902.) A woman, 23 years of age, had suffered from laryngeal tuberculosis for 2 years. After marriage and pregnancy, examination showed an increased tubercular infiltration. This increased and was followed, later, by dyspnea, so that it was considered desirable to induce labor. After the birth of the child, an improvement took place in the dyspnea, but the ulceration continued to progress, and death followed during the following month. The writer recommends an early induction of labor in early laryngeal tuberculosis, where the disease of the lungs is not too advanced. *Goodale.*

Case of Hereditary Localized Edema Proving Fatal by Laryngeal Obstruction.

GRIFFITH (*British Medical Journal*, June 14, 1902) gives an interesting description of a case of angio-neurotic edema in a female which was carefully watched for six years, during which she had many attacks. Her father was the subject of similar lesions, and died also from sudden laryngeal edema. Her death was sudden. Post-mortem revealed extensive edema of the larynx, affecting not only the mucous membrane, but also the deeper connective tissue and the endomysium.

Wyatt Wingrave.

Observations on Intubation of the Larynx.

GOODSELL. (*Edinburgh Medical Journal*, March, 1902.) An analysis of 101 cases, 44 being followed by tracheotomy, and 7 in which it failed. Unsuccessful intubation were due to (1) inexperience; (2) glottic spasm; (3) glottic edema; (4) use of gag aggravating dyspnea.

Wyatt Wingrave.

V.—MISCELLANEOUS.

Paraffin Injections.

NEUMANN (*Prayer Med. Wchsch.* No. 26, 1902) employed paraffin injections in a case of facial disfigurement follow-

ing an operation upon a cyst of the antrum. 3 c. c. of paraffin at the melting point of 42° C. mixed with salicylate of soda (5 per cent.) were injected through the margin of the wound, into the cavity previously occupied by the cyst. A portion of the paraffin came away subsequently in small pieces, and a subsequent injection of 2 C. C. of paraffin was made. The wound subsequently closed, and the paraffin has remained in the cavity without reaction. *Goodale.*

Etiology of Diphtheria.

ZUPNIC. (*Prager Med. Wchnsch.*, No. 34, 1902.) 1. In a considerable number of cases of unquestionable Bretonneau's diphtheria, there are no Loeffler bacilli present. 2. Loeffler bacilli are frequently found in a large number of diseases in the mucous membrane of the respiratory organs, having nothing in common with Bretanneau's diphtheria. 3. Loeffler bacilli may remain for a long time in the mucous membranes of healthy persons, who have never had diphtheria previously. 4. The disease produced by the inoculation of Loeffler bacilli in animals is totally different from human diphtheria. 5. The name diphtheria bacillus includes a number of different varieties, whereas in a typical epidemic of Bretonneau's diphtheria a single exciting factor must be postulated. 6. In the same attack of diphtheria, two or three varieties of Loeffler bacillus may occur side by side. In cases affecting whole families different varieties of the Loeffler bacillus may occur in different members. 7. Cases have occurred of the Brettoneau diphtheria where in spite of a direct transmission of the infection, it was impossible to isolate the Loeffler bacilli. *Goodale.*

Bacteriologic Diagnosis of Diphtheria.

SALUS (*Prager Med. Wchnsch.*, No. 15, 1902) concludes that the diphtheria bacillus is essentially concerned in the production of diphtheria. We can diagnosticate diphtheria bacteriologically to-day better than ever before. We should diagnosticate in all doubtful cases by bacteriologic methods if only for prophylactic reasons. *Goodale.*

Bacteriologic Diagnosis of Diphtheria.

GANGHOFNER (*Prager Med. Wchnsch.*, No. 15, 1902) agrees with the views of Salus in regard to the relation of the diphtheria bacillus to diphtheria, and does not consider

the conclusions of Zupnic justified. A most important argument in favor of the relationship between the organism and the disease consist in the therapeutic results achieved by the use of antitoxin. *Goodale.*

Treatment of Scrofulous Cervical Lymphnodes with Hot Douches.

UNTERBERGER *(St. Petersburger Med. Wchnsch.*, No. 32, 1902) describes a method of treatment of scrofulous cervical glands, by the local application of hot douches of salt water, as practiced in Biarritz. The salt water here comes from a salt spring, containing 23 to 25 per cent. of solids. The patient is placed in a cabinet provided with filiform douches, having a pressure of 7 meters' height. The temperature of the concentrated salt water is 40° C. The treatment is directed for one to three minutes against the affected glands, producing a marked reddening of the skin. After the douche the patient receives a warm bath, and is lightly dried with hot linen towels, but not rubbed down. As a result of this the body is covered with delicate white crystals of salt. The patient lies quietly now a quarter of an hour, and after his return to his room lies quietly for another half hour. After this the patient generally partakes of a meal, and then goes out of doors. As a rule, after the 8th or 10th douche the glands begin to enlarge, and then gradually diminish in size or entirely disappear, as a rule not more than 20 baths are prescribed. Frequently the glands begin to diminish only at the beginning of the ensuing winter. The most comfortable time for the treatment in Biarritz is September and October.

In connection with this local treatment, the patient is directed to add as much salt as possible to his food, and to spend as much time as possible in recreation, in places out of doors, where the ground is impregnated with salt. As a result of all these procedures, the osmotic pressure is increased throughout the whole body, which raises the alkalinity of the blood, and favors tissue metamorphosis.

The writer has employed this method of treatment in the hospital by directing hot douches upon the affected glands for a period of one to three minutes, and thereupon applying hot compresses of salt solution. The results have been very gratifying, and have also been favorable in sub-

cutaneous infiltrations and diseases of the joints and bones. *Goodale.*

The Mechanism of the Circulation in the Vena Jugularis Interna.

MANN (*Zeitsch. f. Ohrenheilk.*, Bd. 40) could see, in a case of total absence of the drum, the bulbus jugularis visible on the floor of the middle-ear. It pulsated strongly. It emptied itself so completely that it almost disappeared from view. This took place almost immediately before the ventricular systole. The dilation was shown, corresponding to the systole. The pulsation is strongest when the head is turned so far to the right that the left mastoid process is just above the sterno clavicular articulation. He draws the following conclusions: (1) Most of the venous blood is carried off by the jugularis interna. (2) Blood movements in the interna are subject to the influence of the respiration. (3) By turning the head to the side, it is caused by the sucking action of the right ventricle. If it is desired to test whether the bulbus or the jugularis is thrombosed, the patient must hold his head in the corresponding position. *Levy.*

Tracheotomy and Intubation as Operations in Diphtheritic Stenosis.

KAHN (*Jahrbuch f. Kinderheilkunde*, 55 Bd) contrasts the indications for tracheotomy and intubation, basing his statements on the results found in the Leipsig Children Clinic. Primary tracheotomy is indicated (1) in rachitic children under one and a half years; (2) in collapse; (3) in septic, gangrenous pharyngeal diphtheria; (4) in pharyngeal diphtheria; (5) in mechanical obstruction in the larynx itself; (6) in edema or emphysema of the throat; (7) if a bronchial stenosis complicates case; (8) in dyspnea even after intubation has been performed. Secondary tracheotomy is indicated (1) when a continuous dyspnea follows the withdrawal of a tube which has laid in position several days; (2) when the tube is stopped by a membrane, or there is danger of it becoming so; (3) when perilaryngeal abscesses appear; (4) when it is impossible to make the child leave the tube in position; (5) when there is difficulty in feeding. In private practice, intubation is to be used only with great care.

Levy.

Tortuosity of the Internal Carotids.

MOORHEAD. (*British Medical Journal*, Feb. 8, 1902.) His experience as demonstrator of anatomy led him to consider it very common, and that it was generally bilateral, occurring in old age and due to arterio-sclerotic changes. *Wyatt Wingrave.*

Intratracheal Injections in Phthisis. Use of Glycerin as a Vehicle and its Advantage Over Oils.

COLIN CAMPBELL, and others. (*British Medical Journal* Feb. 22, 1902.) British Congress on Tuberculosis. Glycerin mixes more freely with the secretions than does oil. It causes an increased flow of pulmonary (sic) secretion. As much as three ounces may be injected at one sitting. Influenced by Delepine and Coutts' experiments which proved that a solution of 1 in 125 would kill tubercle bacilli in sputum in one hour, he injected this solution intratracheally with excellent results.

Formula of solutions:

Medicinal Izal	℥iij
Menthol	℥ij
Glycerin	℥iv

Wyatt Wingrave.

Esophagotomy for a Foreign Body.

M. C. CRINDLE. (*British Medical Journal*, May 31, 1902.) Boy, aged 16, swallowed a tie clip, which was located in the esophagus by x-ray about one inch above the level of sternum. It was removed by esophagotomy. Drainage tube left in wound was removed on 11th day. Fed per rectum till 11th day, entirely by mouth on 15th day. *Wyatt Wingrave.*

Electric Light in Diseases of the Respiratory Organs.

W. FREUDENTHAL, New York (*N. Y. Medical Journal*, July 12, 1902), presents a valuable contribution to the literature of electrotherapy, which should be read in full.

The author first discusses the physiologic effects of electric light and quotes experiments of Bergel to show that molecular activity is set into activity by the action of light and ceases in complete darkness. Blue and violet rays are bactericidal, but do not penetrate beneath the cutis. Red rays can enter the lungs. The growth of the bacillus of typhoid is hindered by direct sunlight. The electric ligh

increases powerfully the metabolism of the skin, and so assists action of the kidneys and lungs. While the incandescent light has been used therapeutically, the author prefers now the arc light. This he uses in the form of the ordinary searchlight. The sittings are daily, for a space of 30 minutes. The strong heat produced can be relieved by a glass screen. This, however, absorbs, in part, the ultra-violet rays; so, frequent turning of the chair, with application of ice-cloths, is preferred. The author has used it since 1889 in tuberculosis of the larynx and lungs. He does not claim that it cures advanced cases, but that it is a valuable adjunct to our other remedies in relieving dysphagia and pain in the chest. In beginning cases, he believes he has effected several cures. He quotes at length the histories of several cases where good results have been secured. *Harris.*

Anesthetizing of the Mucous Membranes with 25 Per Cent. Alcoholic Cocain Solution.

W. WROBLEWSKI (*Archiv. für Laryng.*, Bd. 12) highly recommends the use of a 25 per cent. alcoholic cocain solution in operations on the nose, throat and larynx. In many cases the patient did not have even the sense of touch. *Levy.*

The Nerve Element in Diseases of the Nose and Throat.

W. G. B. HARLAND, Philadelphia. (*Philadelphia Medical Journal*, Aug. 23, 1902.) A plea for the careful study by the specialist of the general as well as the local conditions in those cases coming under his attention, on account of the intimate relationship which exists between the ear, nose and throat and the general nervous system. In the cases reported, showing the complex relationship between the nose, the eyes and the uterus, treatment of all three was required before a cure was effected. *Richards.*

A Discussion of the Morbid Conditions of the Upper Respiratory Tract Resulting from the Infectious Diseases.

C. M. COBB, Boston. (*Philadelphia Medical Journal*, May 24, 1902). The author regards a large number of the cases of sinus trouble and of chronic catarrhal discharge in the nose and throat as being due to the ultimate results of the infectious diseases. Out of 102 cases which complained of nasal or postnasal discharge, without nasal obstruction, he found that 25 followed attacks of in-

fluenza; 14, diphtheria; 7, scarlet fever; 6, measles; 4, typhoid fever; and 2, pneumonia. He does not believe in treatment during the height of the primary disease, and thinks there is danger in the use of sprays and douches, as these are almost certain to carry the disease further than it would have gone if left alone. One of the most serious consequences of treatment by douches and sprays is the involvement of the middle ear. The Klebs-Löffler bacilli persist a long time in the nose and may be a source of menace to the public. *Richards.*

Report of Five Cases of Asthma Treated with Silver Nitrate Injections.

H. T. BASS, Tarboro, N. C. (*Philadelphia Medical Journal*, June 21, 1902.) These cases of asthma were treated by the hypodermic injection of five drops of a two and a half per cent. solution of silver nitrate, placed under the skin over the vagus nerve, a little to the side of the carotid artery, about midway between the angle of the jaw and the clavicle, in accordance with the method of Dr. Mays. Injections were given every eight days. Two cases seem to have been permanently relieved, while the other three were relieved somewhat while under active treatment. In three of the cases abscesses formed at the point of injection. (Further experience with this agent would seem to be necessary before it can be very enthusiastically recommended). *Richards.*

Recent Advances in Laryngology.

CHARLES H. KNIGHT, New York. (*Therapeutic Monthly*, June, 1902.) The author's experiences with metallic intranasal supports for the corretion of external nasal deformities have been unsatisfactory. He th nks the new method of paraffin injections has met with generally favorable results. Certain precautions are observed. There must be a perfectly aseptic mixture of the paraffin and cocoa butter, the melting point of which should be between 97 and 104° F., as there is danger of fat embolus if it is too fluid. The mixture must be carefully sterlized, and attention to antiseptic details insured; as some instances of violent local reaction and three of actual suppuration have occurred. "The injected material is said to become encapsulated and to some extent traversed

by fibers of connective tissue. The amount used is proportioned to the degree of deformity."

"There seems to be no limit to the possibilities of paraffin injections and no objection to their employment except such as may be attendant upon avoidable carelessness in technique."

Richards Lake has used this method for enlarging the turbinated bodies that had undergone absorption in a case of atrophic rhinitis. "Five minim injections of paraffin at weekly intervals led to remarkable improvement in the local appearances and the subjective symptoms."

While admitting that adenoids can be removed from a conscious child, providing one's assistants are sufficiently muscular, the author regards such an operation as not only brutal, but impossible to be as thoroughly done in a struggling patient as it ought to be. For an anesthetic, he regards chloroform as especially dangerous in children with lymphatism, and thinks the combination of nitrous oxid gas and ether leaves nothing to be desired as regards comfort, celerity and safety. While ethyl bromid is growing in favor, experience with it is still too limited to justify a final opinion.

But little progress has been made in the treatment of malignant disease of the larynx; and, in spite of the occasional successful radical extirpations, he thinks the majority of patients would decline to submit to the mutilation involved in complete laryngectomy. Unless something is developed from X-ray therapy, we have only to contemplate an existence prolonged by a tracheotomy and alleviated by the use of anodynes.

In the case of laryngeal tuberculosis, radical surgical measures should be reserved for cases of superficial or circumscribed laryngeal disease in those affected with a limited or quiescent pulmonary lesion, and for those rare cases of primary laryngeal disease in which complete eradication seems feasible. In some cases ethereal solutions of iodoform are soothing; in others inhalations of menthol act well; orthoform seems to be the most satisfactory sedative thus far offered. *Richards.*

BOOK NOTICES.

Klinische Vorträge aus des Gebiete der Otologie und Pharyngo-Rhinologie.

Herausgeben von Prof. Dr. Haus-Münchenn.

Fünfter	Band.	Fünfter Heft.	Die Ozena.
"	"	Sechtes "	Das Heufieber.
"	"	Siebentes "	Ohr und Sprache.
"	"	Achtes "	Functionsprüfung des Ohres.

The publishing house of Gustav Fischer in Jena continues this series of clinical lectures (see review in the February, 1902, ANNALS OF OTOLOGY for preceding numbers), and in this way opportunity is given to present monographs on special subjects of oto-laryngology with a freshness that can hardly be found in a volume or text-book covering the whole field. Each monograph is, of course, written by one man, who, after reviewing the recent literature of his topic, adds his own opinion and experience and makes his own personal standpoint the one from which he finally examines the matter.

The *fifth volume, fifth number*, pages 297 to 338, treats of *ozena*. Wilhelm Grosskopff, of Osnabruck, is the author, and he cites 234 references since 1896, before which he refers to the exhaustive literature index to be found in Hegemann's Handbuch. Many of these references are from French, English and American sources, and it is a pleasure to note how thoroughly he has scanned our own literature for them.

He uses the usual subdivisions of symptoms, objective and subjective, Diagnosis, Prognosis, Etiology, Pathologic Anatomy and Treatment. Perhaps the examination of the various theories for the causation of ozena is as interesting as any of his chapters, for he finds six well established causes as given, and ranks his authors under their various banners. Treatment is, of course, what we like to see, and hence we have sixteen pages of it—unusually exhaustive for a German. Cleanliness is the essential (by douches, by tamponade); then he subdivides under eight heads the remaining procedures. 1. Surgical. 2. Massage. 3. Electricity. 4. Serumtherapy. 5. Anterior tamponade. 6. Local drug treatment. 7. Combined methods. 8. General bodily care.

Grosskopff is an advocate of no particular theory or school, though he likes tamponade and seems to have been encouraged by the use of phenol, natr. sulforicin. in 30 per cent. solution mixed with equal parts of water.

It is a well arranged study of this discouraging subject. The price of this number is 1 mark. 20 pf.

Fifth volume, sixth number, pages 341 to 400, is by Dr. Emanuel Fink (Hamburg), on *Hay Fever and Other Forms of Nervous*

Catarrh. He has a long history of the disease and an equal long analysis of the symptoms. His treatment occupies fourteen pages, part of which, however, discusses various methods only to discard them. The gist of his thesis is found italicised thus: "I think I have discovered a drug thoroughly trustworthy for all forms of nervous coryza; its use seems based on rational theory, and to have proved itself of value in practice in all uncomplicated cases." This miracle working drug is *aristol* and it must be applied to the mucous membrane of the antrum of Highmore. The author then gives his method, and describes fourteen cases in which he effected a cure by this means.

There are 93 citations from recent literature. It becomes finally such special pleading that some of the value as a completed lecture is lost. (Cost 1 mark, 50 pf.)

Fifth volume, seventh number, deals with the acoustic test by means of speech. Treitel, of Berlin, takes from pages 403 to 417 to analyze the use of the vowels and consonants of the human voice in testing the ear's perception. He does not agree with Wolf and explains why the latter's tables are misleading. Much stress is laid on the statement that the vowels are equally grasped by the patient to form the complete word by guess. Word hearing is not the same as tone hearing. He does not theorize, but brings many facts to show the difficulty of constant scale of spoken sounds. Much of the utility of the essay is lost for foreigners, because the sounds as represented by the printed symbol differ in languages, and exact translation should be supplied before its English application should be attempted.

Fifth volume, eighth number, pages 421 to 447, is by Zimmermann, in Dresden, and deals with the *Purpose and Methods of Testing the Ear's Function.* This essay is intentionally placed immediately after that dealing with speech as test of the function of the ear, as Zimmermann has much to say about the method of oral and whistle tests. He commends the watch and the piano as being practical and places a conservative but unprejudiced estimate on tuning forks. Mehle's, Schwabach's, Gelle's and Rinne's tests are all explained (though not in detail) as completing the findings by the simple and more exact methods. A. B. HALE.

Die Berufskheiten des Ohres und der Oberen Luftwege.

von Dr. med. Friedrich Röpke in Solingen. Wiesbaden, J. F. Bergman, 1902. 5 Marks.

(This is the second number of the series on Aural Therapeutics edited by Dr. Körner.)

This work by Röpke is very comprehensive, evincing an enormous amount of patient labor by the author. The motif of the work, as the title implies, is an inquiry into the influences of occupation as causing diseases of the ear and upper air passages.

We are all aware that various occupations have characteristic pathologic effects upon the human organism, e. g., workers in lead contact lead poisoning; workers in phosphorus get necroses; and

wool sorters are affected with anthrax; but Röpke's work awakens us to a realization of the very general dependence of ear, nose and throat diseases upon occupations.

In studying the relations of occupations to disease, Dr. Röpke has taken the pains to get an intimate personal acquaintance with the details of processes and manipulations in the great number of trades and occupations. His descriptions of these matters render his work incidentally of general interest aside from its main professional purpose.

The scope of the work may best be illustrated by inserting here an abridgement of the table of contents. The diversity of the trades and occupations considered will thus be be clearly shown:—

A. The Occupation Diseases of the Ear and Upper Air Passages among Industrial Laborers and Trade Workers.

I. Mining.
II. Chemicals.
III. Metallic Industry.
IV. Stones and Earths.
V. Building Pursuits.
VI. Wood Working and Allied Pursuits.
VII. Polygraphic Pursuits.
VIII. Dye Stuffs.
IX. Explosive Substances and Inflammable Goods.
X. Fertilizer Factories, Tanneries, Glue Factories.
XI. Oils, Fats, Varnishes and Resins.
XII. Heating and Lighting Materials and Their By-Products.
XIII. Textiles.
XIV. Paper.
XV. Clothing and Cleansing.
XVI. Provisions and Delicacies.

B. Among Agricultural Laborers.
C. Among Soldiers.
D. Among Employees in Public Traffic.
E. Among Sportsmen.
F. Among Those Belonging to Various Vocations.

The subdivisions are numerous. It would seem as if scarcely a trade or occupation had passed unnoticed in relation to its effect upon the ear and upper air passages. From coal-miners up to balloonists and then down to pearl divers are far reaches; from football players, boxers and wrestlers to nuns and musicians is a decided change; yet all these occupations are considered, and serve here to illustrate the inclusiveness of the work.

The work is of value for reference and as an illustration of a painstaking, scientific method of research. Röpke's plan might well be used generally in determining the relation of occupation to other organs and functions of the body.

For ready diagnostic aid, this book is not especially adapted. It can, however, be made of use in this respect if one realizes the importance—which the work tacitly emphasizes—of accurate detailed histories of cases. In diseases of uncertain etiology, by references

to Röpke's book, unexpected causal relationship may often be found between the patient's occupation and his pathologic condition. Thus also the line of treatment may be rendered clear as consisting either in a change of occupation or in the use of greater precaution in its exercise.

To the book is appended:— "A Scientific Summary of the Occupation Diseases of the Ear and of the Upper Air Passages arranged alphabetically according to the particular kinds of occupation with reference to the seat of nature of the disease."

By reference to this table one may discover readily in the case of a particular pathologic condition of the ear or upper air passages just what occupations are liable to the affection. Occasionally, also, the special cause of the affection designated in parenthesis. For example, in the case of eczema of the lobe of the ear we find that among others who incur the affections are:

Chimney Sweepers (Soot) 136.

Rope Makers (Tar) 95.

Swedish-Watch Factory Workers (Paraffin) 81.

The numbers refer to the page of the book upon which a detailed account of the subject may be found.

A similar table would be valuable arranged with the occupations as headings, and stating briefly the diseases to which each occupation is liable. Such a table, would be of course, merely a recapitulation of the subject matter of the book, but in its tabulated from it would be of value for ready reference.

The bibliography of the book is compendious. Commendation of Röpke's work is somewhat superrogatory. It speaks for itself. The thoroughness which is as characteristic of articles written as of articles made in Germany is exemplified in this book.

J. H. Lindsey, M. D.,
Fall River, Mass.

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